Proceedings

Royal Musical Association, International ...

PROCEEDINGS

OF THE

MUSICAL ASSOCIATION

FOR THE INVESTIGATION AND
DISCUSSION OF SUBJECTS CONNECTED WITH THE
ART AND SCIENCE OF MUSIC.

FOUNDED MAY 29, 1874.

FIFTEENTH SESSION, 1888-89.

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RULES AND REGULATIONS

Passed at Four Special General Meetings of the Members, held at 27, Harley Street, W., on February 7 and April 3, 1876, on January 6, 1879, and on December 6, 1886.

OBJECTS AND CONSTITUTION.

THIS Association is called the "MUSICAL ASSOCIATION" and is formed for the investigation and discussion of subjects connected with the Art, Science, and History of Music; and is intended to be similar in its organisation to existing Learned Societies.

It is not intended that the Association shall give concerts, or undertake any publications other than those of their own Proceedings, or the Papers read at their Meetings.

MEMBERS.

The Association shall consist of practical and theoretical musicians, as well as those whose researches have been directed to the science of acoustics, the history of the art, or other kindred subjects.

Any person desirous of being admitted into the Association must be proposed by two members. Foreigners resident abroad and distinguished in the Art, Science, or Literature of Music, may be nominated by the Council for election as Honorary Members of the Association.

Elections will take place by ballot of the members present at any of the ordinary meetings, and one adverse vote in four shall exclude.

No newly elected member shall be entitled to attend the meetings until the annual subscription be paid.

SUBSCRIPTION.

The annual subscription to the Association is one guinea, which shall become due on the 1st of November in each year.

Any member *may*, upon or at any time after election, become a life member of the Association by payment of a composition of £10 10s. in lieu of future annual subscriptions, but in addition to any annual subscription previously paid or due from such member. Such sums shall from time to time be invested in legal security in the names of Trustees, to be appointed by the Council.

Should members desire to withdraw from the Association, they should give notice to the Hon. Sec. on or before the 31st of October.

MEETINGS.

An ordinary meeting shall be held on the first Monday in every month, from November to June inclusive, at 5 P.M., when, after the despatch of ordinary business, Papers will be read and discussed.

An annual general meeting of members only shall be held at 4 P.M. on the last Monday in October, to receive and deliberate on the Report of the Council, and to elect the Council and officers for the ensuing year.

Special general meetings may be summoned whenever the Council may consider it necessary; and they shall be at all times bound to do so on receiving a requisition in writing from five members, specifying the nature of the business to be transacted. At least one week's notice of such special meeting shall be given by circular to every member, and ten members present at any general meeting shall constitute a quorum.

Every member shall have the privilege of introducing one visitor at the ordinary meetings, on writing the name in a book provided for that purpose, or sending a written order.

COMMUNICATIONS.

Papers proposed to be read at the meetings may treat of any subject connected with the Art, Science, or History of Music, Acoustics, and other kindred subjects.

Papers will be received from or through any member of the Association.

Experiments and performances may be introduced, when limited to the illustration of the Paper read.

All communications read will become thenceforth the property of the Association (unless there shall have been some previous arrangements to the contrary), and the Council may publish the same in any way and at any time they may think proper.

REPORTS.

A Report of the Proceedings of the Association, including the Papers read or abstracts of the same, and abstracts of the Discussions, shall be printed and distributed to the members as soon as possible after the end of each session.

This Report will be arranged and edited by the Honorary Secretary, under the direction of the Council.

COUNCIL AND OFFICERS.

The management of the affairs of the Association shall be vested in a Council, to be elected by ballot at the general meeting of the members on the last Monday in October.

The Council shall consist of a President, Vice-Presidents, and ten ordinary members of the Association.

The Honorary Secretary of the Association shall be *ex officio* an ordinary member of Council.

The President, Vice-Presidents, Auditors, and five ordinary members of the Council shall retire every year, but shall be eligible for re-election.

At the annual general meeting in October, the Council shall present a balloting list, showing the names of the persons whom they propose for the offices of President, Vice-Presidents, and ordinary members of Council for the ensuing year. A copy of this list shall be given to each member present.

In voting, each member may erase any name or names from the balloting list, and may substitute the name or names of any other person or persons whom he considers eligible for each respective office; but the number of names on the list, after such erasure or substitution, must not exceed the number to be elected to the respective offices as above enumerated. Those lists which do not accord with these directions shall be rejected.

The Chairman of the meeting shall cause the balloting papers to be collected, and after they have been examined by himself and two scrutineers, to be appointed by the members, he shall report to the meeting the result of such examination, and shall then destroy the balloting papers. Auditors shall be appointed at the annual general meeting by the members, and the statement of accounts shall be sent by the Treasurer to the Auditors, and be remitted by them to the Secretary in time to enable the Council to judge of the prospects of the Association, and to prepare their report in accordance therewith.

The Council and officers shall meet as often as the business of the Association may require, and at every meeting three members of Council shall constitute a quorum.

ENACTMENT OR ALTERATION OF RULES AND REGULATIONS.

No rules and regulations can be enacted, altered, or rescinded, except at a special meeting of members summoned for the express purpose, the summons stating distinctly and fully the matter to be brought under consideration.

MUSICAL ASSOCIATION.

FOR THE INVESTIGATION AND DISCUSSION OF SUBJECTS CONNECTED WITH THE ART AND SCIENCE OF MUSIC.

FOUNDED MAY 29, 1874.

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MUSICAL ASSOCIATION.

FOURTEENTH SESSION, 1887-88.

REPORT.

THE Annual General Meeting of the Musical Association was held at No. 27, Harley Street, Cavendish Square, on Monday, 29th of October, 1888:

W. H. CUMMINGS, Esq., in the Chair.

The following REPORT *of the Council was read by the Secretary*:—

The Council has the pleasure to present to the Members its Annual Report of the Fourteenth Session, in the course of which papers have been contributed by Messrs. JAMES HEFFERNAN, J. F. ROWBOTHAM, MACDONALD SMITH (per T. L. SOUTHGATE), H. C. BANISTER, EBENEZER PROUT, JAMES SHEDLOCK, Rev. J. H. MEE, and Dr. CHAS. W. PEARCE. These papers and the discussions thereon have been printed in the proceedings of the Association, and a copy sent, in accordance with the Rules, to each Member,

1. The price which had hitherto been charged to non-Members for the Annual Proceedings barely covered the cost of printing, &c., and was found, moreover, to have the effect of preventing many persons from becoming Members. This being evidently unfair to those who have supported the Association disinterestedly, and from a conviction that it was doing good and sound work, the Council has felt it imperative to raise the price to One Guinea net for each Session's Proceedings. Members desiring extra or back volumes may make application to the Secretary, and the Council will then fix a price for the same.

2. Since the last General Meeting the Associtaion has to deplore the loss by death of two of its most honoured Members and Vice-Presidents—viz., Sir GEORGE MACFARREN and Mr. WILLIAM CHAPPELL, who had belonged to the Association from its foundation, and had taken an active interest in its work. Their services to the Art and to Musical Literature have been of inestimable value, and have made their mark on the time.

3. The Council, while glad to report that several new Members have been elected, and that several others are

awaiting election, feels most strongly that the numbers of the Association are much below what is desirable, as there have been considerable losses by death and resignation. Although of opinion that the steps it has taken will result in the continued and increased prosperity of the Association, the Council relies upon its efforts being actively seconded by Members individually, in endeavouring to obtain new Members.

4. Acting under a rule passed on 6th December, 1886, the Council nominated as Honorary Foreign Members three gentlemen—viz., Mons. GEVAERT, Herr SPITTA, and Professor VON HELMHOLTZ, and they were in due course elected by the Association. The Council has further ordered that copies of the Proceedings shall be sent to various Foreign Musical Institutions.

5. Although it is frequently announced that papers will be received from or through Members, it very rarely happens that such are offered voluntarily. It would add much to the usefulness of the proceedings if it were remembered that the Hon. Secretary will always be glad to receive offers either of papers of the usual length or of shorter communications, on points of interest, which can be read, in addition to the staple matter, at any meeting.

6. The Balance Sheet, which, duly audited, lies upon the table for inspection, shows that a small balance is due to the Treasurer. Additional expenses have been incurred by the Council, in order to promote the interests of the Association; but these expenses can be duly met if Members will not allow their subscriptions to fall into arrears, and if they will bear in mind, moreover, that all subscriptions are due at the *commencement* of the Session, on 1st November in each year. As a proof that the Association is on a sound financial basis, it may be pointed out that the trustees hold in investment the sum of £350 in the 2½ per cents., and that the sum due to the Treasurer is more than counterbalanced by the amount of outstanding subscriptions.

7. The members of Council retiring from office this year are Messrs. BANISTER, CRAWFORD, PRAEGER, SERGISON, and STEPHENS, who are eligible for re-election. Members have, however, the right to nominate other gentlemen to serve on the Council.

THE MUSICAL ASSOCIATION.

FINANCIAL YEAR FROM NOVEMBER, 1887, TO OCTOBER, 1888.

Hon. Treasurer's Statement of Receipts and Disbursements.

Dr.

	£	s.	d.
To Balance from last Account	19	10	4
„ Subscriptions received for 1887	5	5	0
„ „ „ „ 1888	115	10	0
„ One Year's Dividends on £350 Stock, at 2½ per cent.	8	10	4
„ Sale of Copies of the Proceedings	1	15	0
„ Balance due to Treasurer	4	7	0
	£154	17	8

Subscriptions outstanding:—

	£	s.	d.
3—1886, 4—1887, 14—1888	22	1	0
Part Subscription, 1887	0	13	0
	£22	14	0

Cr.

	£	s.	d.
By Printing	66	8	0
„ Advertising	10	10	0
„ Reporting	18	18	0
„ Rent	14	3	6
„ Petty Expenses	14	18	2
„ Assistant Secretary's Salary	30	0	0
	£154	17	8

Examined and found correct, October 29, 1888.

W. S. COLLARD,
D. J. BLAIKLEY, *Auditors.*

ALFRED H. LITTLETON,
Hon. Treasurer.

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November 5, 1888.

Dr. W. H. MONK

In the Chair.

BROTHERHOOD'S TECHNICON: THE NECESSITY OF A SYSTEMATIC AND SCIENTIFIC DEVELOPMENT OF THE MUSCLES OF THE HAND AND ARM FOR PIANOFORTE PLAYERS.

By Ridley Prentice.

When I undertook to read a paper on the necessity of a scientific development of the muscles of the hand and arm, apart from the keyboard, I was not aware how fully and admirably the subject had been treated during our last session by Mr. Southgate. The matter is however of such vital importance that it cannot be too frequently insisted upon; and I trust, therefore, those members of our Society who are devoted to branches of the art other than pianoforte-playing will pardon us if we again occupy their time.

The demands made by composers upon the executive abilities of players constitute an ever-increasing quantity. Of this fact the three representative names—Beethoven, Chopin, Liszt—furnish sufficient proof. Students are consequently obliged to devote more and more time to mere technical study, to the training of the implement with which they are to work. This would be a most serious matter had we to consider only the loss of time involved; for to the student every moment is precious, and the day far too short for the work which has to be done. But even this evil is of less importance than the muscular and nervous strain which is the inevitable result, a strain leading often to a complete break-down, or to a deadening of the artistic perceptions and faculties; this latter being perhaps a greater, because a less recognised, danger. One of our most clever young pianoforte professors has told me that he used to devote regularly four or five hours a day to mere technical study, with the result that in the evening

his muscles were always in a state of collapse and refused altogether to do their work. I am bound to say he has by this means attained a very fine *technique*, with, however, as I think, serious loss in other respects. The question for us is, "Is there no remedy for this state of things?"

1. Without using any technical terms we may describe the process of playing as follows: The brain receives certain impressions and wills that certain motions shall take place. A message is conveyed by the motor nerves from the brain to the muscles, whereupon these contract or relax themselves (as the case may be), and produce the blows upon the keys. The ear acts as a gauge or tell-tale as to whether the muscles have done their work properly and carried out the intentions of the brain. Thus the motor nerves and the muscles together constitute a delicate and sensitive instrument which is essential to our purpose. If this instrument is defective or untrained the result must be bad, no matter how finely organised may be the brain and the sense of hearing. This is surely an unanswerable reply to objectors who say that no mechanical training is of any use, that all exercise must be artistic. Formed as we are we can work only through mechanical means. A great conductor studies a score and hears the music perfectly in his mind, but he cannot express it on the keyboard, owing to a lack of mechanical muscular training. His brain is trained to originate, his ear to act as a tell-tale, but nerves and muscles are undeveloped in the particular direction needed. So with an untrained, or imperfectly trained, pianist: his ear is perpetually informing his brain that its messages have not been properly delivered and acted upon. This irritates and confuses the brain, so that it in turn becomes unable to act with the requisite decision and delicacy; and thus the whole artistic nature of the player suffers, owing entirely to a lack of scientific mechanical training.

2. Now, I think everyone will admit that the keyboard has no pretensions to be a gymnastic apparatus suitable for this scientific training; it was not invented for any such purpose. The player's hand and arm remain practically always in the same position, subject of course to innumerable slight changes, which do not however affect the argument. The set of muscles exercised is always the same. Here is at once a source of weakness. All motions of the limbs, all positions of the limbs, even in a state of rest, are the result of a balance between two opposing sets of muscles. If one set is strengthened unduly, the other set becomes too weak for its work, and gives way. In the great majority of cases where weakness is due to excessive practice it shows itself at the back of the hand and just above the wrist. To understand the reason of this, let us glance briefly at the muscles employed.

3. For our present purpose those of the upper arm need not be separately considered. Taking the muscles of the fore-arm and hand we find two broad divisions—the flexors and extensors. As you probably know, the flexors lie on the front of the fore-arm, taking their rise, some from the elbow and some from the bones of the fore-arm. They connect with tendons, some of which pass through the wrist and are attached to the front surfaces of the finger bones, while others are attached at the wrist itself. When these flexor muscles contract they bend the wrist and fingers. The extensors lie at the back of the fore-arm, their tendons being similarly attached to the back surfaces of the wrist and finger bones. Their office is to straighten the wrist and fingers. It is evident therefore that any motion, any position even, of the hand is the result of a balance between these two opposing sets of muscles, the flexors and the extensors. If the extensors were absent the hand would remain firmly closed; we should have no power of opening it. On the other hand, if the flexors were absent we should have no power of closing it. It is easy to perceive the vital importance to a pianist of an equal development of each set of muscles.

The numerous muscles in the hand need not be particularised, if we bear in mind that this same principle of opposing forces applies in every case. They are briefly—muscles which move the fingers sideways (these lie between the bones of the hand); small muscles which connect the extensors and flexors and serve to steady the fingers; muscles for moving the thumb freely in all directions and for enabling it to grasp (these lie in the fleshy part at the base of the thumb); muscles which act on the little finger (these lie in the fleshy mass at the inside of the hand).

4. Now, all exercise at the keyboard develops the flexors more than the extensors. The flexors have not merely to bend the wrist and fingers, but also to resist the blow upon the key. This fact condemns the keyboard as a gymnastic and muscle-training apparatus. Evidently we must include in this condemnation the digitorium, dumb piano, and all similar inventions; these are indeed worse than the pianoforte keyboard, because, where the position and motion of the fingers are the same as in pianoforte-playing, it is essential to have the sound as a guide; otherwise we cannot possibly know whether a proper blow has been given. This is what Schumann meant when he said, "Try dumb keyboards for yourself that you may discover them to be of no value. One cannot learn to speak from the dumb." These inventions fail because they are unscientific and do not tend to the equal training of all the muscles.

5. The Technicon is free from this defect. In its construction two main principles have been observed—(*a*) That

special training must be provided for the extensors; (*b*) that each individual muscle (or set of muscles) must be exercised separately, with the attention firmly fixed on the end desired, the result being the training at once of the muscle and the motor nerve which acts upon it. The chief effect of a regular course of gymnastic exercises on the Technicon is an increased power of control over the motions of the fingers, and thus a greater command of the finer gradations of tone. There also results more strength of finger, which in these days of thick strings and ever-increasing tension is a not unimportant consideration. As a frequent objection to the use of gymnastic exercises is that they merely strengthen the muscles, I would ask you to specially consider this statement, that the most valuable result is an increase of control such as cannot possibly be gained at the keyboard.

Proofs are constantly accumulating that in the majority of cases inability to play quick passages arises, not from stiffness of muscles and joints, but simply from a lack of this power of control. Only the other day a letter appeared in a musical paper, *The Etude*, of Philadelphia, furnishing a striking instance of this. It is in answer to the editor's recommendation that the correspondent should use the Technicon.

"I wish in particular to acknowledge my indebtedness to the Technicon, for without it I do not believe I could have accomplished anything, owing to the helpless condition of my hands before using it. My confidence in this invention and my interest in the theories on which it is founded is unlimited.

"You will remember I wrote you that my trouble was caused by stiff muscles and joints; the Technicon has proven this to be a mistake, *and taught me a great many technical secrets*, one of which is the ability to use one muscle or set of muscles while all others are kept at rest and under control. The *inability* to do this was *the* obstruction to my progress. This is but one of many advantages I have gained through the Technicon."

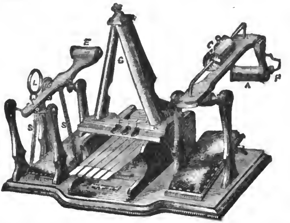
These statements I do not ask you to accept altogether on the authority of a musician. I have discussed the matter with, and shown the Technicon to some eight or nine medical men, and they agree that it is a most valuable invention, doing what it professes—*i.e.*, developing and training each set of muscles individually and in a scientific manner. For one doctor I went through the exercises with my arm uncovered, and he found that he could feel or see each separate bit of muscle doing its work when called upon. Mr. Walter Pye, surgeon at St. Mary's Hospital, has very kindly come here to-day to speak, from the surgeon's point of view, as to the value of the Technicon. He considers it will be of immense service in cases where there has been a partial loss of muscular and nervous energy.

Of my own experience I can speak very strongly. For some years, having all my time occupied in teaching, I had not played in public. Having used the Technicon regularly, it was possible for me, a few months ago, to give a Pianoforte Recital, when I included in the programme a Sonata by Brahms, and played with a great sense of freedom and with a largely increased control over the gradations of tone. A very curious and important point is the effect which these slow and carefully considered exercises have in giving rapidity of execution. To test this, after only one or two trials of the Technicon, I played at full speed, and without any pause, twice through the *Finale* from Weber's Sonata in C (known as the "Moto Perpetuo") and twice through the accompaniment to Schubert's "Erl-King." This constituted a severe test for finger and wrist muscles. At the end I was conscious of no fatigue or aching, and felt as if I could have gone on playing for an indefinite time; and this, when I was entirely out of practice. With pupils the results have been equally wonderful. One very clever pupil was entirely breaking down. Technical exercise had to be abandoned, as it instantly brought on severe pain in the extensor muscles, and consequent nervous exhaustion. The Technicon has completely cured her. Another pupil had, when she came to me, the very hardest touch which it has ever been my lot to hear, and that is saying a good deal. Each finger came down upon the key with a blow such as could have been given by nothing else in this world, unless it were, perhaps, a Nasmyth steam hammer. We struggled hard with this formidable monster of a touch, but could not succeed in thoroughly taming it until, by means of the Technicon, the extensor muscles were so much strengthened that they were enabled to hold the flexors in check, and now the tone becomes daily more sympathetic and musical.

6. I will now show the various exercises on the Technicon, but I propose to do this in the briefest manner possible. At the close of the proceedings any members of the audience who wish will, I hope, ask for further explanations, or try the movements for themselves Each motion is to be repeated rather slowly and steadily about twenty times, first with the right and then with the left hand, thus avoiding any undue strain on either hand. The weight or spring is to be so adjusted that the pull shall feel quite light, the best results being obtained by frequently repeated motions with a light weight. The attention must be firmly fixed upon the particular muscle which is being exercised so that the conductive power of the motor nerve may be also increased.

Taking first the right-hand lever. The weight C is (as you see) easily adjustable. The roller A rests sometimes on the backs, sometimes on the tips of the fingers. The various

movements develop both flexor and extensor muscles, but the latter have to do more work, inasmuch as besides straightening the wrist and fingers, they have to lift the weight of the roller.



The use of the triangle G develops the small muscles of the hand, and also stretches the ligaments which join the large knuckles and which constitute a frequent cause of stiffness. By means of the grooves F, F, F, at its base, we develop the muscles used in imparting a sideway motion to the fingers.

The resistance of the left-hand lever is regulated by two springs, S, S, and can be increased or lessened at will by simply inserting their hooks in other eyes. By means of the leather loop L the thumb and each separate finger can be exercised independently. Here only one spring must be employed. Insert the first finger in the loop, hold the whole hand straight out, raise it an inch and a half, then slowly and steadily lower and raise the first finger, taking care that there is no sympathetic action of the muscles of the other fingers. This motion appears simple, but if you will try it, even without the Technicon, you will find it not easy to control the small muscles so that there shall not be the least trembling of the other fingers. To use the further end of this lever E the hand must be held palm upwards, and the lever drawn down by the fingers. (All these various movements were shown on the Technicon by the lecturer.)

7. Allow me now, in conclusion, to hope that you will give your assent to the four following propositions, and that having done so, you will act upon them in the training of your own hands and with your pupils :—

(*a*.) Pianoforte playing is an intellectual and artistic process; but, like all such processes, can only be carried out by mechanical means—*i.e.*, the motor nerves and muscles.

(*b.*) The keyboard is not adapted to develop these means.

(*c.*) The Technicon is.

(*d.*) Finger gymnastics should be recognised as an essential part of pianoforte training, introductory to and accompanying technical studies, though not of course superseding them.

DISCUSSION.

THE CHAIRMAN.—Ladies and gentlemen, my first duty is to propose in your name a vote of thanks to Mr. Ridley Prentice for his paper to-day. In doing that I shall purposely avoid saying anything at length upon the subject, because I know that there are many of our friends here who most certainly have something important to say on this question, and therefore I ask you to empower me to record your vote of thanks to Mr. Prentice in the first place.

The vote of thanks was carried unanimously.

MR. WALTER PYE.—Mr. Chairman, it is rather an embarrassing thing for an absolute stranger, and also an outcast in the sense of being an absolute amateur, to attempt to find any instructive words after this very interesting paper of my friend, Mr. Prentice. Indeed, it has been to me exceptionally interesting, because it is very curious to see the ideas which trouble us medical men from a surgical point of view cropping up again very plainly from a different standpoint, and yet all coming practically to the same thing. I was much interested in hearing what Mr. Prentice said about this question of muscular control in connection with muscular efficiency, because it has been to us a very old standing difficulty indeed to understand how it comes about that the more rapidly and the more mechanically perfectly (especially with regard to rapidity) muscular movements are performed, still, *pari passu* with that, there frequently goes on a steadily increasing inefficiency of their performance. We find it as a pathological fact in pianoforte-players. As to that point my own experience has not been large, for I have not seen many cases of true pianoforte-players' cramp; but we get it in other analogous cases over and over again—that is to say, as soon as ever we find that the will and the intelligence are separated from the muscular performance we get at first an increased absolutely mechanical efficiency, and then if it is persevered in we get a gradual inefficiency, which ends frequently in absolute loss of power; as, for instance, in writers' cramp, which is a well-known example. Again, there is hammerman's cramp, which is perhaps a still better one, where we get people who are obliged to perform hundreds and thousands of separate movements of their wrists and

arms very quickly, as in manipulating nails and bolts. A good hammerman will go on improving for some time, and then gradually will find his power of performing these movements become ill-regulated, ill-directed, until at last he loses the capacity of guiding his blows at all. On investigation it is found that the contraction of these muscles, acting purely as they have got to do by long course of habit without the intervention and control of the will, instead of being done with the head, is done mechanically with the hand and wrist, and that this has exercised a degenerating action upon the muscles until they actually waste. It was about the same time that Mr. Brotherhood was over here that a very different person also visited the country, Herr Julius Woolff, who was, I believe, originally a writing master somewhere in Germany. He had, and has, great success in the cure of writers' cramp; and the way he went to work was quite germane to the matter we are discussing. Writers' cramp is by no means confined to clerks or mechanical writers, but it is confined to those who write a great deal, and especially those who write in a very mechanical fashion. Gradually these people find that the muscles of the thumb are not to be depended upon, so that they will start a letter but will not be able to get through two lines before the pen flies over the paper in an indistinguishable scrawl. All our old ideas of curing this disorder went upon the principle of *rest* to obviate the use of the thumb, either by fixing the pen by a band to the wrist or by contriving a plan of writing from the elbow, and so on. But what Herr Woolff went upon is exactly the same principle as that upon which the development of the muscles by the Technicon depends. He showed that if by discipline of the will people would concentrate their attention on the orderly and intelligent actions of these muscles, through certain regular organised movements, the cramp would disappear, and the muscles would regain that strength which they had lost. From the surgeon's point of view one finds over and over again examples of this truth. Thus, in the treatment of curved backs, orderly, thoughtful, regular performance of gymnastics, as distinguished from the irregular mechanical tossing about of the ordinary drill sergeant, produces most marked results, and a gain of strength and control. The Technicon has interested me very much, because it affords such a striking proof that if we are to use our muscles properly we must use them with our heads. With regard to the question of delicacy, that stands on a more purely mechanical and not so much on a physiological basis. There can, however, I should think, be no question but that a percussion, not of the flexors acting by themselves, but one regulated carefully, an action of which every individual element is balanced by sets of muscles

working together, and working regulated by one's intelligence, must effect in some way or other that quality of tone which one can recognise when one hears it, but which defies analysis. From a physiological and surgical point of view the Technicon, I think, has a very strong position. Of course I have only ventured to look at it from that point of view.

Mr. Hopper.—How much practice would Mr. Prentice recommend a day with the Technicon?

Mr. Prentice.—Going through all the exercises takes thirty-five to forty minutes. I do it about three times a week, and should certainly do it every day if it were possible to make time. I find that this keeps my hands and fingers in very good order.

The Chairman.—May I ask if the exercises that you have described to us accompany the machine as part of the invention?

Mr. Prentice.—Yes. They are described in the pamphlet and diagrams which are given with the machine.

Mr. Frost.—Suppose a pupil practises the Technicon, in what proportion would it relieve him or her from the ordinary five-finger and scale exercises which now they have to go through?

Mr. Prentice.—We must certainly not entertain the idea that we are going to get rid of technical work. But I do go so far as to say that when a man has got through his technical work and ceased to be a student, he need not, unless in very exceptional circumstances, do anything besides exercises with the Technicon to keep his fingers in perfect order—*i.e.*, his *technique* would remain at the pitch at which he had already arrived. With regard to students, I feel very strongly on this point, because I have experienced great benefit from it myself, and I have no hesitation in saying that thirty-five or forty minutes' practice with the Technicon is equivalent to two hours' technical work. I have not the slightest hesitation in saying, moreover, that by that means results are obtained which you could never get at the keyboard in any time, although you might practise for ever. The remarks of my friend Mr. Walter Pye may help you to understand the reason of this. The Technicon goes on scientific principles, and develops the muscles which are too slightly developed by the keyboard, and therefore I maintain that the practice of the keyboard will not give you the balance of the muscles, because you go on developing the flexor muscles more than the extensor. However much technical work is done there is always that lack of balance. Of course, objectors may say—look at Rubinstein. If I were a Rubinstein I should not use the Technicon. If you take exceptional men like that I think it does not affect the

argument. We have to try to make ourselves, I will not say like Rubinstein, but to get as near him as we can.

Mr. Hopper.—Do you recommend the exercises to be always used very slowly?

Mr. Prentice.—As a whole they should be slowly done. These movements with the centre of the apparatus there is no object in doing slowly, as they are simply to free the wrist. It might be interesting to know that Mr. Brotherhood is a civil engineer and amateur player of the pianoforte, with a very stiff hand, like a great many amateurs. He set himself to think on this matter why his hand was so stiff, and whether he could not improve it, and after experimenting for some six or seven years he finally got the machine into this shape.

The Rev. Henry Cart.—I noticed Mr. Brotherhood mentions spring keys; I would ask if Mr. Prentice considers them of equal importance.

Mr. Prentice.—My answer is that the spring keys are not *here;* I have left them behind. If I had brought them I should have destroyed my position altogether. I have been inveighing against dumb pianos and the digitorium. It is true the keys on the Technicon are an immense improvement on the ordinary digitorium, but I have left them out; they are entirely apart from the instrument itself and do not go on the same basis at all. I maintain that the exceeding great value of this instrument rests on the fact of its developing all the sets of muscles equally.

Dr. Vincent.—Do you recommend them for every student, or do you find it not necessary in some cases?

Mr. Prentice.—I think however well a student may play there is a possibility of improvement, and, as is clear from what I have said, and what Mr. Walter Pye has said, there must be the lack, to a greater or less extent, of the balance between these two sets of muscles. Therefore, I always recommend my pupils to have a Technicon, without exception.

Mr. F. G. Edwards.—Is it at all fatiguing at the end of a hard day's work to go through these exercises?

Mr. Prentice.—That is one great advantage. After a day's teaching, when one has had the sound of the pianoforte in one's ears for six or seven hours, it is physically impossible to do any technical work, and I think if one forced oneself to do it after dinner one would do more harm than good; but I find I can do these exercises because there is no noise involved. It is a totally different motion from anything one does on the keyboard, and I find it does not fatigue me to have half-an-hour or forty minutes in the evening going through these exercises. One's ear is not exercised at all, so that the sense of hearing is rested, which is, I think, for a

musician an absolutely essential feature, if he is hearing the pianoforte all day.

Mr. J. A. Fuller Maitland.—Do you think the Technicon would do to give to very young students, or to those who would not have the power of applying their will very thoughtfully to the exercises? One knows so well that in the digitorium great harm is done by the improper use of the appliance.

Mr. Prentice.—There is undoubtedly a difficulty in colleges and schools in introducing anything of this sort. It requires careful arrangement. There are so many subjects. The pianoforte studies have an hour-and-a-half allowed to them, and it is almost impossible to get more. I have thought over the matter a good deal, and do not quite see what the best plan would be. I think if the principal of the school or college is sufficiently interested to take the matter up, there should be regular classes for the young students, but that they should be classes of gymnastics only. For instance, pupils should do this motion of lowering one finger and keeping the others perfectly still, which is one of the exercises on the Technicon—they should do that in class, all together, without any instrument at all, and so with the movements of the wrist. I think that might be carried out, and then with the older girls it might be arranged that they use the Technicon. But undoubtedly it should not be put into the hands of very small children who would do more harm than good.

Mr. Maitland.—I hardly mean very young children, but young students, who would be liable to use it in an improper way.

Mr. Prentice.—I think the older girls in schools, fourteen or fifteen, might safely be allowed to use it, especially if the muscles had been previously scientifically trained to a certain extent by a variety of exercises different from those that are used at the keyboard. A girl who has had previous training should, when she gets to the age of fourteen or fifteen, be capable of using the Technicon sensibly; of course the governess should see that the weight was put at the proper place, and it should not be allowed to be varied at all.

Dr. Wilkinson.—Could Mr. Prentice tell us the cost of this instrument?

Mr. Prentice.—The price is £5; it is to be seen at Augener's in Newgate Street.

Dr. Wilkinson.—Are the exercises sufficiently clear to enable anyone to use them without instruction?

Mr. Prentice.—I think so. There is a pamphlet here which is given with the Technicon, and which contains diagrams of all the movements I have described and a full description; so that with thought and care there can be no difficulty at all in carrying out the exercises.

Mr. Southgate.—Mr. Ridley Prentice has asked us to agree to several propositions which he has put before us in a succinct and clear form as to the value of the Technicon and the necessity of these particular exercises. As probably most of you are aware, I read a Paper on this subject last session, and I find myself fully in agreement with what Mr. Prentice has said, perhaps with one slight doubt. One cannot but regard all these instruments for dêveloping the muscles and helping pianoforte players as a very useful mode of saving time. The exercises which one has to go through now absorb such a very large amount of time, that if we can get through these in a shorter period with equal effect, undoubtedly it would be advisable to employ instruments of this character. But, as you know, there have been many exceptions taken to them; Schumann especially protested against dumb pianos, because you cannot learn to speak from the dumb. In all probability the early instruments which were used, the chiroplast and the instrument which Thalberg used, were made on a wrong plan, and I think now we seem to be getting more into the right mode of looking at the subject. In pianoforte playing there are only certain muscles to be exercised, and that in a certain way; if we can exercise these just in the way in which they are required for pianoforte playing, I think we have accomplished a very great deal, and that probably by a very little expenditure of time compared to the daily scale and five-finger practice. I am a little doubtful whether all the exercises Mr. Prentice has shown us on this instrument are absolutely needed. Of course one who has not tried the apparatus should speak with reserve, as Mr. Prentice has himself been through them, and perhaps his testimony is better than the guesses of others. Clearly the number of motions required in pianoforte playing can be reduced to a very few; it strikes me it would be a still further saving of time were we to confine ourselves entirely to those and not go beyond them. One exercise I noticed which he showed us was to rest the weight on the end of the finger and then bring it down. Now I fail to see that we require that motion in pianoforte playing, although possibly the same muscles are exercised; still, it may be so. With regard to the use of this instrument, questions have been asked of Mr. Prentice as to whether it should be recommended to everybody or not. Pupils differ very much, and pianists differ. Some seem to have an innate gift of playing which is denied to others. I may state with regard to the particular apparatus which was here last session, invented by Mr. Macdonald Smith, that I showed the exercises to a great many people, and amongst others I showed them to a lady who is certainly very singularly gifted. She was a pupil of W. H. Holmes at the Royal Academy of Music, is a wonderful

reader, and a very marvellous pianist, although she has retired from the profession. She took this apparatus in hand, and although I could do most of the exercises, she failed in doing one. It is almost needless for me to say that I could not possibly play as she does, and so we were much disconcerted at the result of the trial. Probably the fact is that the exercises simply wanted a little knack, and some amount of skill; had this lady worked at it a little she would no doubt have acquired it. But it is right I should say that she is a pianist who never seems to need practice, and yet she can play any possible thing that is put before her; no doubt she is an exceptionally gifted person. Again, another gentleman who until lately was a member of this Association, whose name I am sure will be always heard with respect here, Mr. George Osborne, who still, although over 80 years of age, is a marvellous player—he plays Liszt, Chopin, Beethoven, and anything with much greater strength of finger than I can, and, moreover, despite his long career of teaching, does not seem to have lost any of his poetic feeling, as might be expected with one who had arrived at the age of eighty—Mr. Osborne also tried this apparatus, and could not succeed in accomplishing the task set before him. I only mention these instances to point out that persons differ in their capacities and in their gifts, so it must not be supposed that because certain exercises cannot be accomplished that therefore the pianoforte cannot be well played. I do not think Mr. Prentice will venture to assert that for a moment. I asked him before the lecture commenced whether he himself had felt any distinct benefit from the use of this apparatus, and he says frankly that he has, and we ought to take that as a distinct testimony that the apparatus is of value. Exception has been taken—I think Mr. Stephens did so, and very rightly and properly as an artist—whether the practice of mechanical exercises is not calculated to a certain extent to deaden the artistic faculty; whether going over the same thing again and again without any sound resulting or any distinct effect being produced, does not do a certain amount of harm to the poetic side of music. As I pointed out in my Paper, it is impossible to attain artistic perfection without one also possesses technical facility, the two are distinctly bound together. We may have an admirable conception of what ought to be done, and know exactly how it should be done, and are well able to criticise people who do it, but that by no means implies that we can accomplish it ourselves. In order, therefore, to obtain the technical facility of giving due expression to the feelings of the artist and the composer, it is absolutely necessary to go through a great number of exercises. There may be some people so gifted that they require very little practice, but the majority require a very great deal, and to those undoubtedly

as a means of saving time and labour I cannot but think that the Technicon, and all instruments of that character, are of distinct value.

Mr. Gilbert Webb.—Mr. Prentice has dwelt very much on the cultivation of the extensor muscles, but we must remember that the work has to be done by the flexor muscles, and they require to be the stronger. The great fault in pianoforte playing is that the fingers are not lifted, but it seems to me a question whether practice on the harmonium, where the lifting of the finger is as necessary as putting it down, would not be equally beneficial to the practice of the extensor muscles.

Mr. Southgate.—That was one of the special features of Mr. Macdonald Smith's invention. He insisted that it was not only necessary to put the finger down, but also to raise it very rapidly, and several who had considered the matter agreed thoroughly with him. Also, that rapid motions were not so necessary, nor the overcoming of great weights, for organs and pianofortes are no longer built so that there is the great resistance to overcome that there used to be, but it is very necessary to raise the finger very rapidly. That is especially so in staccato playing, and, in fact, in legato playing also. I will not venture to compare the two apparatuses together, because perhaps that might introduce a discord that we should have a difficulty in resolving; but a special feature of Mr. Smith's apparatus was, that when the work intended to be done was accomplished, an audible signal was given—a small bell being sounded. I think that is of some little value, because when one gets to do mechanical exercises in a mechanical manner, mind wandering begins: one gentleman has already told us how dangerous that is, and I hope everybody will take his warning to heart; but if you are doing certain work and you know that when that is done a signal is given, there is a distinct advantage in that mode of proceeding.

Mr. Prentice.—May I be allowed to notice at once the suggestion that perhaps so large a variety of exercises is unnecessary. Mr. Walter Pye ought properly to speak to that, as he would do so with more authority than myself; but in my view one essential good of the invention is that there is such a large variety of exercises, that the muscles are exercised in so many different ways, and strengthened in all possible ways so that any weakness is prevented. With regard to the point that some very good pianists are unable to do these exercises, I might perhaps be allowed to refer to a pupil of my own again. She played very finely indeed, and she was almost breaking down; when she got this Technicon she put the weight down at the very lower end, so that there was absolutely no perceptible weight at all, and

tried this first exercise. When she had done it four times she could not do it any more, her hand failed, and she lost all power, and the muscles ached so much she could not go on. I think that is a clear proof that the extensor muscles were in fault. May I say that, Mr. Pye?

Mr. Pye.—It was no doubt the commencement of paralysis.

Mr. Prentice.—The exercise consisted in lifting the hand from the wrist. Other people in the house could do the exercise perfectly well for any length of time—in fact, there was nothing to do; but my pupil could not, because of that weakness which she has now got rid of. It seems to me that is absolute proof that the extensor muscles were entirely in fault, and that the practice at the keyboard develops the flexors to an undue extent. Then there was one other point Mr. Southgate mentioned—that these things without any sound were calculated to produce mechanical action.

Mr. Southgate.—That it might lead to mind wandering, and then one might forget the very object to be obtained.

Mr. Prentice.—I do not find that myself; but there is the other point to be considered—that if you do ordinary technical work at the pianoforte it is almost impossible to avoid deadening the artistic feeling. Everybody feels that it is a most fearful strain on the artistic feeling. I do not think the danger alluded to exists at all, but if it did the other danger is far worse.

Mr. Pye.—The great point about this instrument is that it is impossible to perform some of these exercises unless you are thinking what you are going to do. Mind wandering would absolutely prevent the whole thing being useful; but that is practically prevented, because most of the exercises would be very difficult to do unless you were actually thinking about them all the time.

Mr. Webb.—I should like to ask Mr. Pye, is it possible to exercise the flexors in the motion of striking downwards and necessarily lifting up afterwards without at the same time increasing the power of the extensors?

Mr. Pye.—As an abstract question certainly not. The only thing is that if the flexors are used without any purposeful use of the extensors, the extensors come off second best. They contract in a very much more mechanical fashion. They will contract, no doubt, because the fingers have to be raised, but they are not exercised as much as the others.

Mr. Webb.—Normally the extensors are the stronger, are they not?

Mr. Pye.—Oh, no; all over the body the flexors are stronger than the extensors.

Mr. Webb.—Because they have more to do.

Mr. Pye.—That may be so, but they are stronger—they are considerably stronger.

Mr. Webb.—Is it not well to increase the strength in that proportion?

Mr. Pye.—I should almost have thought that in an artificial performance such as pianoforte playing one ought to overcome natural conditions to some extent.

Mr. Prentice.—May I say on that point that the flexors are exercised a great deal in these motions, and they are exercised differently from the way in which they are exercised at the keyboard. I dwelt so strongly on the exercise and strengthening of the extensors because that to my mind is the chief point. The flexors are certainly exercised in various ways, so that even for them I consider the invention is of distinct value. The exercise of the stiff finger under this lever I should think gave very strong exercise to the flexors.

Mr. Pye.—To the flexors of the wrist certainly, but it would probably put a contraction on the extensors of the finger in order to enable it to continue upright.

Mr. Prentice.—Then there is also the exercise having the lever at the top of the finger and raising the finger by itself; in lowering there must be a very strong exercise of the flexors in order to keep the motion quite steady. That would exercise the flexors both of the wrist and the fingers.

Mr. Webb.—I take it the machine would be valuable in a preservative sense, but it would not develop tone or rapidity of motion.

Mr. Prentice.—Oh, yes.

Mr. Southgate.—If you gain control of muscle you gain gradation of tone at once.

Mr. Prentice.—Gradation of tone is what I want to insist upon most of all. Control over the finger gives gradation of tone. As I understand it, the motion of the finger towards the key can be better controlled by the extensor muscles when they are more strengthened, and then I know as the result of my own experience that it gives immense rapidity of motion. It is a slow exercise, because as one exercises the muscles in a thoughtful way one gets very much more power of control over them; but certainly, as a matter of fact, control and rapidity both come together. I do not know whether I have given a right explanation of it.

Mr. Charles Stephens.—As one who has exceeded those hours of six, seven, or eight, of which my friend spoke, and has gone on for nine, ten, eleven, and sometimes approaching twelve in the occupation of teaching, I must confess that I have often deplored that some system could not be devised which would facilitate the progress of the pupils in whom one takes an interest, and save a great deal of valuable time which could be better occupied than in mere strumming away on the pianoforte. I must confess that up to the

present time all appliances I have ever seen appear to me to have been very disastrous in their results, and I am very pleased to hear the remark from Mr. Pye to the effect that it is an absence of mental occupation in the process that does all the mischief. I know those who have practised with other mechanical instruments to such an extent that at last their movement of finger became purely automatic, scarcely operated upon by the will. That is just the thing which produces the disastrous effect in pianoforte playing; so much of modern playing, skilful as it is, rapid as it is, wonderful as it is in many ways, nevertheless seems to abrogate the whole charm of the instrument for the sake of pure *technique*, and I think nothing can be more fatal. I feel that the tone of the pianoforte depends so much on the particular player that where it is finest there is some process of the will at work in which some cannot excel. I feel that if we adopt anything which produces mere automatic action and abrogates the mental process, we do decided mischief, and I cannot quote a stronger or higher authority than Madame Schumann herself, who says that technical exercises are used to the extent of dragging all the music out of the brain of a pupil. Now the effect of the appliances made use of for the pianoforte have been to render the tone indurated, hard, and disagreeable. Even at times the *pianissimo*, which may be attempted by those who practise too much at technical exercises, is simply unpleasant to me. You hear a touch that gives a life-giving effect as it were to the tone, and you hear another one which is dull and heavy. I take it that the whole secret has been revealed by Mr. Pye's explanation, that in the one case the mind is not concerned and in the other it is. Whatever instrument we make use of let it not destroy that mental process without which tone and beauty can never be attained.

Mr. Prentice.—As to that remark of Madame Schumann's, that this amount of technical work may draw all the music out of the pupil's head, I quite sympathise with it and agree with it entirely; but we ought to consider how much of that result is due to the deadening effect on the sense of hearing, whether that is not the evil, and whether, therefore, the remark does not furnish a further argument as to the immense value of the Technicon.

The Chairman.—Ladies and gentlemen, we have already recorded our thanks to Mr. Prentice for his paper, and if I may be allowed one remark as Chairman, I may say it occurs to my mind that all this discussion, and the facts which we have heard, show clearly that we want more than ever what we have been all our lives wanting, and must continue to want as long as we have to learn—we want the experience of

a wise teacher, a man who will not give an instrument like this to a child, who will break her fingers in no time about it, but one who knows how to use it. This instrument then seemed to me to be good for those who really know how to use it, and in that the pupil should be directed by the same wise teacher, who should direct her what authors she is to read and what composers she ought to play.

Mr. PRENTICE then proposed a vote of thanks to the Chairman, which concluded the proceedings.

DECEMBER 3, 1888.

MAJOR G. A. CRAWFORD, M.A.,

IN THE CHAIR.

THE INSTINCTS OF MUSICAL FORM.

BY E. H. TURPIN.

FULLY aware of the ambiguous character of the title, which for want of a better heading I have ventured to give to the paper I am permitted to read before you upon this occasion, it may be well to explain my general position with regard to the subject-matter I desire now to lay before you.

Perhaps I cannot do better than modestly follow the example of some authors by proclaiming in advance what I do not propose to attempt in the course of the present brief paper. It is not my purpose, then, to enter the field of technical musical knowledge; indeed, before such an assembly as this such a course might be presumptuous. Again, I am not about to treat my subject from the poetic side, for though a noble piece of music may truly be an "ecstatic dream" to sensitively organised and cultured listeners, like all the other arts and sciences it demands on the part of the workman the exercise of patient investigation, method, adjustment, and no small amount of practical well-ordered industry. I will even add, that its want of definiteness of purpose, its exalted isolation above the objects of our daily lives, from which the poet, the painter, the architect, and sculptor learn so much and deal with so constantly, make not less but perhaps greater demands upon the practical skill of the composer. By this time you have doubtless concluded that I am only about to offer speculative remarks concerning which I can but hope a few will be suggestive enough to invoke further, and I trust more useful thoughts, in the minds of my many gifted and learned listeners.

For reasons which will be presently apparent and because illustration is most easily conveyed upon familiar lines, I propose in my remarks to treat music as a language—not in a technical or grammatical sense, but merely by way of

instituting some general comparisons. To be entirely frank, it is part of my present proposal to show that music, although the purest and in some respects the most exalted of the arts, is not an independent art power, but is one member of the great art family; amenable, and I venture to think specially so as regards the department of the art we are now considering, to certain natural laws and acquired habits of thought which govern all the other members of the sisterhood of art. A learned writer tells us that he believes in "the convertibility of the intellectual forces," and that according to his experience, "mental development though multiform in manifestations is really only one process"; and that "there are no sharply defined independent faculties." Without pushing forward this doctrine, which must certainly commend itself to many who reflect on the varied gifts and attainments of many eminent men, I will now proceed with my task.

There are, I take it, two divisions in the great family of the arts. These divisions are not so much created by differences of principle, although there are necessarily some differences, as by the fact that one division will be found to build up creations erected in tangible materials which appeal to the mind through the sense of sight; whilst the members of the other division employ the intangible material we speak of as sound, and appeal to the mind through the sense of hearing; so music belongs, in a semi-independent way, to the linguistic group of the arts. To the first division obviously belong painting, architecture, and sculpture; to the second division, it is equally clear, belong literature of all types, oratory, and music. In all the arts of both divisions we find certain great natural laws asserting themselves. Thus evolution and multiplication of detail, gravitation of detail to central, structural points, and the due proportion of the various parts forming a given whole, are apparent in all forms of objectivity, whether tabulated as objects of nature or of art. Some of what I have ventured to call the "instincts of musical form" are to be ascribed to the universal action of these great laws; we note the evolutionary and multiplying processes in the endless and multiform presentation of musical feet and figures which make up the initial germs of ideas and themes; we observe the principle of tone gravitation in the concentration of upper partial tones over a fundamental sound, in the attraction of melodic particles to some central or pivot notes as recognised in the old authentic and plagal mode formations, and in the various harmonic sympathies; we note the power of proportion in the balance of parts forming musical harmony, in rhythmical forms, in musical architecture of the larger type, and in the adjustment of contrasted tone-colour effects and expressive tone-

variations. Much might also be said of the amenability to primary natural laws of the comparatively slow procession of foundation-tones or chord-roots, the regular though more or less concealed recurrence of pulsatory or count-beats, and the application of points of musical ornamentation. No modern growth of what may be called the artificiality of the art has quickened or seriously modified the pace at which chord-roots can be satisfactorily grasped by the listener; again, save in the expression of dramatic effects and in the portrayal of such emotions as fear, horror, and surprise, no composer has been able to dispense with the life-giving, recurrent pulsation-beats; and the absence of points of musical ornamentation would greatly diminish if not destroy musical objectivity and mar that sense of beauty which is a distinct *raison d'être* of every form of art.

The chords form, as it were, an internal framework or skeleton, bones, muscles, and nerves of the musical structure. As well as a source of refined mental, soul-stirring delight, the count-beats are as the circulation of the blood, the very physical heart of a piece of music, as well as a power whereby performer and listener are together mentally bound to the strong, sweet tone-links we call music—be it remembered too, pulsatory power and accentuation existed in music before time was measured and counted; and musical ornamentation forms an external skin or covering whereby the framework and the pulsations are covered, and features of beauty and melodic graces are revealed.

It is our present business to deal specially with those natural and artistic conditions which, owing to the absence of what may be distinguished as solid material, more particularly affect the art-forms committed to the mind through the sense of hearing. These conditions seem to be the necessity that literary and musical workmen are under in the way of prompting and strengthening the power of the reader or listener's memory, and the development of the writer, speaker, or composer's purpose, by slowly to be enunciated logical processes.

Goethe said: "Music requires no material, no subject-matter whose effect must be deducted." This is true of music, but it is largely true of all literary forms of art, the chief difference being the fact that, whilst the poet draws much of his detail from the teachings and aspirations of human life, the musician deals only with human aspirations and with sounds which, heaven-like, are away from, and above the requirements of our daily life. One may add the reflection that the function of the artist, and of the tone-creating artist, seems to be that of uniting the mortal and immortal attributes of that complex creature, man. Physically, brain power is comparatively weak and limited as a rule; but the

power of what may be called mental conception is often large and sometimes apparently unlimited and vast beyond comprehension. Nature benevolently recognises this, one would almost imagine, in the process of duplication; and art-workers, consciously or unconsciously imitating nature, and by force of experience, follow the same instinct of duplication, whereby powerful mental conceptions are secured and the strain upon the mental faculties is, as far as possible, minimised. But further, this process of multiplication greatly favours the exercise of the law of order and the instinct of proportion. Broadly viewed, the outlines of form, especially as regards the arts which build up their impressions through the medium of physically evanescent sounds and ostensibly through some form of reading, are presentation or exposition, development and recapitulation or resultant attainment. Such processes have not only grown in the various arts in identically the same manner, but they characterise the operations of nature herself, and they are typical of the course of human life, in which development and education follow the dawn of existence, and attainment crowns directed human effort. The instincts of musical form would seem to correspond with those we note in all forms of literary composition, because they are called into existence by human infirmities, a sense of hearing not always in full communication with the mind through the defective action of more or less limited brain power, and liability to loss of detail and weakness of impression through defective or untrained faculties of memory. Doubtless these conditions greatly affect the reception of new musical works and largely account for the abiding success of good music made up of ideality strengthened by repetition and hallowed by association. Permit me to now remind you more definitely of the universality of form instincts. The playwright presents his characters, proceeds by artistic devices to show their developing features, and finally draws them together to form the catastrophe, which anciently was regarded as the fourth and final division of a drama. Similarly the novelist presents his personalities and pictures his scenes of action as they arise to his purposes, proceeds to unfold the processes of character development, and finally draws together the individualities of his fancy to be judged and rewarded. The preacher and the orator present texts and propositions which are followed by developing arguments, to be in turn succeeded by drawn conclusions, not unfrequently terminated by the verbal coda or peroration. I need not point this roughly drawn comparison by showing that the musician's themes are his characters, his two chief subjects often having, as a German author points out, distinctly masculine and feminine contrasted characteristics. He has also his development of leading individualities or

ideas, his episodical incidental thoughts, his catastrophe in the presence of resumed and intensified subject-matter, and his peroration in the coda, a feature the musician of modern times has perhaps more largely developed than any other worker in the realms of creative art. An extension of these comparisons might be made in the direction of showing something of the excursive and returning attributes, the going-out and returning-home arrangements in dealing with the historical or imaginary characters of literary workmanship; and comparing these methods of treatment with that ruling principle of musical form, the excursion to the dominant, as seen in so large an amount of modern music, or into some other related key, and the completion of this tonal or key assertion by the return home to the domain of the original tonic. Some of the instincts of musical form are displayed in those modifications and distinct methods known in poetry as the lyric, epic, and dramatic forms. Music has been spoken of as a language, and as such it has its regular or poetical, and its more irregular or prose methods of rhythmical measurement. But it has this notable advantage over the verbal language—its punctuation and divisions always accompany the meaning of its sentences. This advantage is something of a set-off in view of the absence in music of that linguistic definiteness of human purpose which verbal language gains by its constant and familiar use in and connection with the work of our daily life. Music, therefore, possesses abundantly that faculty of accent and metre, by the regularity of which poetry gains a strong hold on the reader or listener's memory, and which is one of the earliest defined form instincts of the human mind. The analogy between the instincts of poetical and musical construction gathers strength, to my mind, by a further consideration of the departments of artistic thought recognised as the lyric, epic, and dramatic.

The lyric, both poet and musician regard as what may be spoken of as the song form; expressing a sentiment, describing actions in which the narrator takes only a passive or reflective part, or reflectively picturing a scene. The lyric form may be more or less dramatic, as it is objective or subjective. An eminent critic describes these important subdivisions in the following homely words: "The former expresses chiefly the picturing of outward life, as perceived by the senses of the observer, or realised by his fancy. The latter denotes that kind of poetry which gives, instead of the outward scene, the various thoughts and feelings excited by it in the poet's mind." A large proportion of the musical forms instinctively, and by the necessarily ambiguous character of musical sounds, lend themselves specially to the expression of passive and reflective thoughts.

The poet Blair has attempted to define the epic department of the art in the words: "An epic poem is a recital of some illustrious enterprise in a poetic form." So far this is true, but the word epic implies something more: it means also heroic contemplation arousing heroic and courageous mental activity on the part of poet or composer. One of Beethoven's symphonies fully represents from this point of sight the characteristics of an epic poem. And it may be well to add, the instincts of musical form show themselves with equal force in both the vocal and instrumental departments of the art. An oratorio, opera, or symphony may alike illustrate the lyrical, epic, and dramatic instincts of the art, and may show the departments artistically mingled in the same great scheme, in a manner more especially peculiar to music by reason of the conglomeration of small forms which, as will be shown, almost necessarily characterise musical composition. The consideration of dramatic forms of art is a matter calling for a volume, and I can only touch upon this profoundly interesting topic briefly and when, I fear, your patience has already been exhausted.

It is curious that in following the study of human aspirations and actions, the dramatists first succeeded in giving method to the instincts of literary form; not less curious is it that the revolts against what may be called the abuse and tyranny of form should have arisen on the stage at different artistic epochs of the world's history, where all must of necessity be artificial, but where nature is to be seen as in a mirror more completely than in any other form of artistic activity. Strange it is too that in music the dramatic form, viewed in its largest capacity, should have been the latest and not the earliest growth of the art. These words, however, bring one at once to the initial difficulty to be encountered by the composer in writing dramatic works of large dimensions. This difficulty lies in the distinguishing differences between the verbal and musical languages. These are the necessarily remote and ambiguous character of musical sounds and idioms, as compared with the strong direct impulses and associations of a verbal language. The dramatist can tell a story, the constructive purposes and links of which will remain firmly fixed in the listener's memory during a space of action covering several hours. The composer, however, must to a great extent make his large form a compilation of small constructive plans. Here lies the kernel of the dramatic composer's grand difficulty: he cannot altogether reconcile the numerous small forms with the poet's one great constructive scheme, even though in principle both workmen pursue the same methods on the lines of presentation, development, and final assertion or attainment.

The reforms of Gluck were chiefly confined to deepening expression and preserving appropriate naturalness. Another great modern musical philosopher, Wagner, has gone still deeper into this great question. Living later in the story of the art, he had witnessed the slavish abuse of constructive forms and observed that they had lost something of their artistic power by their transparent obviousness. Musical Germany, which had raised the art to its highest classic glory by the perception and magnificent development of the instincts of musical form, was destined to be the scene of a revolt against the arbitrary formality of form—a new instance of tyranny followed by revolution. Wagner grasped the truth that the arts have great principles in common; and his giant efforts to bring the sister arts, indeed all the arts, into one common focus of action are matters of history. His stern resolve not to permit even music, the art he loved best, to obstruct dramatic action; his determination to promptly express every emotion in suitable tones; his revival and employment with magnificent elaboration of the ancient leading-motive, which gave each character its typical and associated musical idiom with given tone-colour accompaniment; and his earnestness and skill in fixing impressions on the mind by tone-colour devices are known to all. It may be that in course of time people will be as readily impressed by and as familiarly acquainted with musical as with verbal forms and idioms; then indeed, by force of this yet to be created artistic memory, will be the full fruition of the philosophic reforms of Wagner. Dr. Collier tells us that: "A tragedy, in its usual form, contains five acts, each act consisting of a variable number of scenes. The third or central act is the natural place for the crisis of the plot, and the fifth for the catastrophe or wind-up of the whole." "Thus," the same writer points out, "in 'Hamlet' the play-scene and the fencing-scene are so arranged that we have a central point as well as a final point of interest; and in 'Julius Cæsar' the murder in the Capitol and the battle of Philippi are arranged upon the same artistic principle." In these words we have the already made comparison enforced; such a plan strikingly recalls the two-fold structure known as the sonata or binary form, with its various processes of presentation and development and its two climacteric divisions. Shakespeare and other dramatists employ, especially in the composition of comedies, another plan, a story intermingled with episodes—the "Midsummer Night's Dream" is a familiar case in point—and this method of construction is well known to musicians in what are called the episodical and rondo forms. The story of the growth of art forms seems to ever be the same—invention and enlargement. Mendelssohn once spoke of Beethoven as the great enlarger

of the art to distinguish him from the inventors who, from the sixteenth century to the time of Mozart, had built up and elaborated modern musical forms, the instincts of which I have been trying to show are to be found in the action of natural laws and in the development of artistic principles evolved through the universal power of those laws. Time will not permit any speculations regarding the present and future methods of construction, which may be brought forward by the activity of artistic form instincts. Men will continue to do what Mendelssohn said Beethoven did—go "further afield" than their predecessors, and new developments will arise; but I venture to add that so far as the instincts of musical form are based upon the strength and eternal action of natural laws, certain principles will remain for the guidance of coming generations of composers. Finally, the instincts of musical form, though distinctly to be traced in the technical growth of the art, deserve to be recognised as philosophical impulses, seeking by artistic methods to strengthen the memory, quicken mental perceptions, and enforce impressions by the exercise of logical power. Wordsworth tells us that by "deeply drinking in the souls of things, we shall be wise perforce." I would urge upon the musical student careful thought regarding the "harmonies and correspondencies" which go to make up the catholicity of art. "He who best knows the poets is the best composer," said Schumann; and the saying has, I think, a meaning which does not stop with a common recognition of human expression or the acknowledgment of the value of general culture, great as that is, but carries the mind to the contemplation of the operation of unchangeable, eternal, and irresistible natural laws.

DISCUSSION.

Dr. C. Hubert Parry.—In default of anybody else rising, I will venture to made a few remarks. You will all admit the difficulty arising from the vastness of the subject, as well as Mr. Turpin; but as the subject is one which I have devoted years to the study of, I feel that I cannot let the occasion pass without venturing to attempt to put some of my views on the question before you also. The first thing I have to remark about Mr. Turpin's admirable paper is that in connection with instrumental music he seems to lay too much stress on the idea, and in connection with dramatic music too little. He said that all the arts have certain features in common, or rather that they are connected in a certain way. They have certain things in common, because they appeal alike to the human mind, which is constituted in regard to all such things in the same sort of way.

There must be principles of form which have a similar relation to the mind in the particular ways which are suited to every art. But I do not think that on the whole the analogy between music and poetry can be carried out quite in such a limited way as Mr. Turpin gave you to understand. It seems to me that music has its own particular kind of form, which is most noticeable in connection with what we call abstract music. I believe the basis of design in music is not the idea, but the form in which the idea is put. I think Mr. Turpin gave us to understand that he considered generally that the basis of the abstract form of the sonata or symphony was the distribution of the ideas. In this I distinctly differ from him. I think that is one of the old superstitions we ought to get rid of. I do not mean to say that the subjects do not form a part of the design; but there are several sides to form in instrumental art, and the subjects are not the most important of them. The most essential feature, and the most subtle amongst the elements of form, is the distribution of keys, or rather of certain relative centres of keys, and centres which are in opposition to one another in the key. I must not go too far aside to refer to the unseen relation that there is between all arts and physiology. But I must say that more and more it appears that the bases of such things are physiological. The basis of the principle of form in art is an appeal to different nerve centres successively. If you appeal to one nerve centre too long you weary it out completely; so you must give a contrast which revives the first by bringing into activity certain other nerve centres. This is shown clearly in the sonata form. First you have to establish the impression of one key centre, and before you have exhausted that entirely, or rather when you have arrived at your term, and made the impression sufficiently strong, you have to tend to the opposite centre. This we find in the most perfect works of art carried out in the most elaborately perfect way. I believe in Beethoven's best sonatas and symphonies there is not a single half-bar that has not a bearing on the system of his design, nor one in which he does not lead the mind step by step either to realise one centre or the passage from one centre to another. Take his F minor Sonata (the first), which is an admirable specimen of simple design. He begins by impressing the mind by two processes—the alternation of the dominant and tonic harmonies and the progression of the bass. The first two bars are written in the tonic harmony, then the third and fourth in the dominant, then the fifth in the tonic, and the sixth in the dominant, so as to establish the key clearly. But besides this the bass begins on F, and having descended to E (the semitonic motion which he regarded as always intelligible of itself), from that moment it rises up steadily until it arrives at the

dominant. There are thus two principles in operation—first, the alternation of the tonic and dominant harmonies; and next, the progression of the bass, which he makes move by diatonic or chromatic steps, and never to exceed such degrees. The purpose is to make the establishment of the principal key so strong that even the most stupid persons shall be able to realise it; and having given the strongest impression of this, the mind is led by similar processes to another point of the scale; generally some centre in opposition to the first one—as with Beethoven either the dominant or the mediant, which both give very strong centres of opposition. A thing noticeable in Beethoven's practice is that the second subject generally marks the dominant key in an extraordinarily clear manner. The object obviously is to establish in the mind the impression of the new centre at once. Very often after that the latter part of what I call the second section is inclined to wander away into other keys for variety, and then back again to the principal contrasting key. And with regard to this second centre one very remarkable point, which nobody can omit to notice who has studied the thing carefully, is that both Haydn and Beethoven, and also Mozart, generally insist on the dominant key at the end of the first half by introducing some pretty effective little phrase which is based on the very simplest and most comprehensive series of harmonies you can find in the whole range of that key; so that you have at the ending of the first half of the movement, the second key established as strongly as possible both by the pleasantness of the idea and also by the simplicity of the harmonies; and thus the first half of the movement establishes as clearly as can be, by every device the musician can supply, the contrast between the two principal keys of the movement. Therefore, I say that the old tradition that a sonata means the opposition of two contrasted *ideas* is not true. If I may take the time I can also go into the question from the historical point of view, and show that from that point of view also it is inaccurate. The origin of what we call the binary form is not the juxtaposition of ideas. Wagner once made a remark to that intent, but that was because he had not studied this particular question very minutely. The fact that it is not so, is proved by the history of this form, and that history is very curious. In the early dance forms there was the same balance of the tonic and the dominant in each half; but the subjects in Couperin, Handel, Bach, and all the old masters are very little distinguished from the context. There is a parallel in rhythm or form of expression between the opening of the movement and the opening of the second half of the movement, something similar in progression, or in the rhythm and melody, but not strongly characterised or definite in contour; and there is also a parallel between the cadence

of each half of the movement. Thus you have the movement divided into two halves, the beginning and the end of each of which have a correspondence—very slight, but just enough to be noticeable. That is the first way in which the form was treated. There was no resting in the contrasting dominant key at the end of the first half, but merely a progression from the tonic key to the dominant key and a close; and the material which is used when the close is made in the dominant corresponds with the material that appears at the end of the movement in the tonic key. All the music which lies between beginning and end of each half is more or less optional. The process of development was then as follows:—By degrees the portion which was attached to the close in the dominant (which was at first merely a close) increased in length and definiteness, until at last it developed into the second subject. The portions grew more and more distinct, and finally you find a definite portion in the tonic and a definite portion in the dominant. Hence it may be proved from historical considerations that the origin of the sonata form was not the juxtaposition of ideas. Now comes another point, which bears on the fact that music has its own principle of form. There is first the very strong definition in every part of the first half of the sonata, and that definition should be, as it is in the most perfect examples, perfect in almost every bar—a definition for the purpose of the progressions, and for the contrasting keys. Then, when you have finished this defined portion of the first half, the object is to produce the impression of artistic confusion, which is the element which appears more or less in what we call the free fantasia or development portion, which begins the second half of the movement. In this there is also in the best masters a perfect system of form. It is here that the power of the master to develop new kinds of form is shown. In Beethoven and Mozart you can scarcely set your finger on any group of six bars which has not some principle of movement which appeals to the human mind in a formal way—such as, by sequence, or by that constant progression upwards or downwards through the degrees of the scale, making the bass move step by step, either in a chromatic or diatonic progression. Another point that you find is, that instead of having a regular systematic balance of two or four bars, you get balances of other groups, to give a very apt impression of a certain vagueness of treatment, which ultimately is based on that regular system which the composer evolves out of his instincts. When you have sufficiently produced the impression of vagueness, this artistic confusion, as I call it, in this portion, you have to establish again your principal key, because of its absence in the development portion; where

we meet with the impression of a wide range of irregularly disposed harmonies, and keys so mixed up with one another in the most charming confusion that the mind is hardly conscious of what the progression is. Then when you get back to the original key you have to establish that again as strongly as you can. That seems to me the principle of development of this particular form. First, the definite contrast of the two centres, such as the tonic and the dominant, and then the development portion, by which you have artistic vagueness, and a fine contrast to the regularity and to the system of the two original keys; and then when you have finished with that you have to establish to the very utmost you possibly can your principal key, not only by repeating your first subject in it, but also by giving the second subject in the same key, and by establishing it still more by the weight which your *coda* also brings to bear in the direction of this same key. I am afraid these remarks are rather diffuse, but I hope my intention on this point has been intelligible—which is to point out that the basis of musical form is essentially a musical principle; that is to say, a process which appeals to the mind by means of certain things which are inherent in music—namely, the centralisation of the keys and the relation which certain groups of harmonies bear to one another. I should not like to stop without saying one word on the subject of its dramatic development, because I think the two things are quite distinct. We all know that Wagner had some original ideas on the subject of abstract form, and we also know that he had some very strong ideas on the subject of dramatic form. I think the two things are quite at opposite poles; and when I have said as much as I have in insisting on the abstract form being clear and definite in every part, so that the real perfection of a true instrumental movement should be that there is no bar superfluous, no bar that has not its place in the ideal sequence, or fails to mark the contrasts of key centres, I shall not be held to have made my conclusions about dramatic form with recklessness. I think we are here on a different footing, because the later development of dramatic art has been based on the enormous development which has taken place since Beethoven's time in the expression of ideas. I think Mr. Turpin conveyed the idea that the modern revolt is a revolt against form; but the revolt is not against form, but against conventionalism. I believe what Gluck felt is what we now feel ourselves, that men like Hasse—I take him as an extreme type of all—had a regular trick of putting things down which pleased the public, and were pleasing to the singers to sing, but were perfectly worthless as regards any vital idea. I think Gluck felt that very strongly. They had particular formularies which they spun out repeatedly to

represent what they chose to call their ideas, which were very dull kinds of things, but which were sufficiently pleasing to the ordinary public. We know also that the operatic audiences in those days spent a great deal of their time in talking, and did not want to be bothered to have to attend to ideas; and you may see in some parts of the world still audiences talking when things are going on which they think are not worthy of their attention. Gluck's feeling was very much what Wagner's was, that they had got into a trick of expression, and that the basis of all musical feeling was dropping altogether out of sight in this regular recurrence of mechanical ingenuity. I think Wagner's feeling was also aroused very much by a great deal that is extremely frivolous in modern operatic art. He felt that it required to be dealt with on a more serious, noble, and deeply felt basis altogether. I think he is right in telling us that an enormous development of musical ideas has taken place since Beethoven. The development of musical idea in its intensest sense has come almost entirely from the romantic school, though Bach anticipated it to a great extent. The late development has come by the building of one thought upon another—by inference, and improvement, and modification—until in the present day we have an enormous mass of musical progressions and figures, which express musical impressions which are intelligible on their own basis, and most easily with the help of indications which the stage can supply. Therefore, I think in relation to dramatic music the principles of form are not necessarily so close and so strong as they are in abstract music. Abstract music is in itself a development of art for itself, and purely out of itself; but in relation to song, and also in relation to dramatic art itself, I should put it on rather a different footing, because there you appeal to the sense which the human mind has of the relations of the musical ideas to definite thoughts; and by the help of the words in the case of the song, or by the stage situation, and the development of the story in the drama you are very much freed from a great deal that is so very straitened in the instrumental forms of the art. But still at the same time you have to develop a certain form; for in dramatic art it is just as indispensable to keep a sense of balances of the keys, and balance of proportion in the use of changing centres of keys. I maintain that Wagner did this, though less systematically than it would be done in abstract music. I cannot indeed believe, in view of physiological and psychological necessities, that we could endure Wagner if he had not instinctively carried out those principles of the distribution of keys, and the relation of keys which are absolutely necessary in order to appeal to the mind of man in the formal sense, and are specially characteristic of the musical art.

Mr. Southgate.—I may say that we want to read this paper through quietly at home, in order to be able to offer any thoughts of value, or to master this matter. But I would tender a remark on the observation of Dr. Parry's with regard to Wagner. He said that Wagner felt the conventionalities in dramatic music were being carried too far, and to a certain extent he endeavoured to reform them, and to get naturalness. Let me say that the opera as represented on the stage must be artificial, very artificial; although some may think Wagner succeeded very well in his self-imposed task, I cannot say that such is entirely my opinion. Allow me to call attention to one particular feature. Like many other composers who set subjects to music, Wagner often delayed the natural action on the stage, and sometimes ignored time in a manner which could not possibly take place in real life. As to his not interrupting the dramatic action, there is one instance which occurs to my mind in which it is interrupted to a terrible extent. That occurs in "Lohengrin," where the heroine is going into church to be married, and I think they are delayed at the church door by a needless altercation of something like twenty minutes. Surely that is an exceedingly conventional proceeding! I believe, if that took place in real life, especially at St. George's, Hanover Square, it would be settled in a very short space of time by a policeman being called in to remove the objecting lady. I should like to hear Mr. Turpin express some opinion respecting the instincts of form in music with regard to birds. We know that many birds warble, or, as it is termed, sing, and it is curious that different birds sing different melodic intervals and with differing rhythm, if I may so express it. I should like to hear whether Mr. Turpin has had his attention directed to this matter, and what is the cause of birds' music being so varied in type. Is it all to be set down to some mysterious instinct?

Miss Prescott—I have a recollection of my old student days when I first learnt from my old master, Professor Macfarren. He used to say that above all things musical form is key and not idea. The repetition of ideas is secondary; but the distribution of the key is the most important element of musical form. You establish the principal key to begin with, and then you modulate either to the dominant or to other keys; but you must begin and end in one key; that constitutes form, that is the broad statement, and it applies to dramatic as well as to instrumental music, he used to say. I know one can find the real sonata form in a great many of the old English ballads. It is the most common form to have one verse ending in the dominant and the second one in the tonic; that is, I suppose, owing to the instincts of form.

Mr. Webb.—I think Mr. Turpin referred to Wagner having revived the Leitmotiv. I can only recall one previous composer in opera using it, and that was Weber in "Der Freischütz." I should like to know if he refers to anything before that date.

Mr. Stephens.—You will find it in Bach.

The Chairman.—I will now ask Mr. Turpin to close the discussion by saying whatever he likes in reply.

Mr. Turpin.—Mr. Chairman, ladies and gentlemen, you are at least indebted to me for one thing. I have succeeded in calling forth some very interesting remarks from able speakers, and so far I think I may claim without vanity that you are indebted to me. You have heard a very interesting and very able speech from Dr. Parry; but I might protest that I do not now approach the musician's technical view, neither do I assert that the sonata system is merely one of juxtaposition of ideas; I do not believe it is. In fact, I am with Dr. Parry in almost all he said. He has had the singular advantage of taking the question from the musician's point of view. I merely took a path and tried to lead the way to the musician's point of sight. I think I should agree with Dr. Parry on most points, and I thank him for having from a musician's point of sight treated the subject in such a masterly manner. I am with him with regard to abstract musical forms, and with regard to the purposes of dramatic music too. My only point on this occasion really was to call your attention to the common principles of all art workers in dealing with the human mind through human infirmities, if I may use the expression. I have tried to show that in order to get at the human heart and mind certain processes seem to be necessary, and these processes are built up in all the arts upon similar principles. I do not deny, of course, that music has its own glories and its own laws, in that I am entirely with Dr. Parry. His masterly speech with regard to Beethoven's manner of workmanship must have been very interesting to you all, and I must thank him very much indeed. I only regret that want of time has prevented me from being as concise, as clear as I hoped to be in my paper; but still, all the same, it has answered my purpose in having elicited so many practical and admirable observations. When I said that Wagner revived the leading motive with magnificent elaboration, I meant that the ancient composers knew perfectly well the original method of using a leading motive—the soldier had the trumpet call, the lover had the phrase on the flute, and so on, all these being conventional inventions; for remember that the leading motive becomes quite a conventional thing in process of time, and it has become so even now. Consequently, I said, and I think advisedly, that

Wagner consciously or unconsciously revived, but did not invent, the leading motive. I am sure we are all very much indebted to Dr. Parry, and personally I must tender him my very best thanks for his very able speech, and I am sure I may thank him also in your name.

The CHAIRMAN.—I think I shall have your unanimous consent in tendering a vote of thanks to Mr. Turpin for his very interesting paper, in which he has opened up a subject which many of us will go home and think out for hours. I think we can give him a vote of thanks, not only for the paper which he has read, but also for the very interesting discussion which has been elicited by it. The vote of thanks was carried unanimously.

JANUARY 7, 1889.

CHARLES E. STEPHENS, ESQ.,

IN THE CHAIR.

CLOSES.

BY F. CORDER.

A VARIETY of causes led me recently to consider attentively the subject of Closes in music, not the least of these causes being the very meagre and superficial way in which the subject is treated in all the theory works with which I am acquainted. Even a satisfactory definition of the term Close or Cadence is hardly to be found, and the sum total of book-information on the subject is to the effect that a Close is the end of a period in music and is distinguished by the occurrence of two particular chords; that the principal kinds of closes are the "perfect," "plagal," and "half" close, but that there is also the "imperfect," "false," or "deceptive" close; thus we are given at least six technical terms for one thing. If the student searches for the meaning of the term "musical period" he is referred back to "Close," so that the definition is of the true dictionary type; merely a cross reference.

To understand all that is involved in the expression "Close" we need to remember two things: firstly, that it is exactly analogous with the "stop" in syntax; and secondly, that music consists of three elements—rhythm, melody, and harmony—in either or all of which a stop may occur. In literature there are four kinds of stops, though it would seem that few people have sufficient sense of rhythm to use them correctly, for punctuation is always left to proof readers now-a-days, in consequence of which that important stop, the colon, is being gradually banished from use, a piteous proof of our national unmusicalness. Stops in music are naturally far more various in length than those of the spoken language,

yet there is considerable resemblance, especially to the comma and the full stop. The former is imitated when either melody, rhythm, or harmony by itself come to an end while the others continue, the latter when all three end at once. But here we require a clear definition of what constitutes a close in the three elements respectively.

1. A close in rhythm is like the end of a line of verse; it consists of the last strong accent (of a group of accents) and may be also accompanied by one or even two weak accents following it.

2. A close in melody is merely the last note or notes of such melody, whatever they may be; but the effect of a full stop is best gained by ending on the tonic.

3. A close in harmony is a progression of chords which ends with the $\frac{5}{3}$ on the tonic.

Accepting these definitions, of which the third alone is new, it will be evident that the term "Close" is, by itself, a vague one, implying at one time the termination of a piece and at another an imperceptible dividing line in the midst of it. We must hold in mind the three constituents of music, else, leaving rhythm out of account, music like that of Bellini or Offenbach might be considered as a string of closes, from the incessant alternation of tonic and dominant chords; or again, leaving melody out of account, the slow movement of the "Pastoral" Symphony might be said to close at every few bars, instead of which the melodies so cunningly overlap that there is no pause from beginning to end.

In thus endeavouring to propound a true definition of the word "Close"—namely, "an ending of melody, rhythm, or harmony"—I must not be understood as urging any reform in the matter. This would be of course futile, living as we do at a time when every one does just as he chooses in matters of theory, and no authority exists which can compel the adoption of any reform, large or small. But knowing, as I do, what a stumbling-block to the pupil technical terms are, I would in all diffidence suggest to those of my fellow teachers whom I see here that the expressions, half close, false close, deceptive cadence, perfect cadence, authentic cadence, plagal cadence, full close, and so on, bear little meaning and might easily be dispensed with, and the generally understood words comma, semicolon, colon, and full stop used instead, if indeed any other than the last be necessary. But indeed the false, imperfect, or deceptive cadence is not a close at all, and the expression is therefore needless, while the plagal and authentic closes have become so indistinguishable in modern times as to demand the abolition of the distinction. Which name, for instance, is the student to give to the following cadence, which Mendelssohn is credited (wrongly) with having first introduced?—

Or the following, which concludes the first act of Sullivan's "Yeomen of the Guard"?—

In both of these the first chord has the subdominant for its base, but its root is the dominant. These terms, "plagal" and "perfect," were well enough in the times when the penultimate chord was almost always either a $\frac{5}{3}$ on the subdominant or dominant, but at the present day the concluding tonic chord may be preceded by all sorts of chords on any note in the chromatic scale; as a matter of fact, there are no less than eighty-four possible penultimate chords, of all of which I have found specimens in good writers—that is, if you will allow me to include Liszt and Grieg in that category. It was originally my intention to have illustrated the whole of these, but perhaps it might weary you, so I will let you off with a dozen or so of the most curious.

At first sight it seems strange that the older composers rarely attempted any innovation in the harmonic element of a close, but the reason for this fact is not far to seek. Of course many curiosities may be noticed in Bach—as, for instance, his use of the raised sixth in the minor key—

BACH (*Prelude to 4th Suite Angl.*).

a chord forbidden by Macfarren but dearly loved by Sterndale Bennett—but one always feels that Bach's harmony is the fortuitous result of his several marvellous counterpoints. Mozart, Haydn, and even Beethoven seldom, if ever, made a full stop that was not such a "plagal" or "perfect cadence" as those described in the grammars. The only license our forefathers permitted themselves was the well-known "Tierce de Picardie," the ending of a minor piece with the major chord of the tonic, which striking effect was doubtless invented by many a seventeenth century musician independently. The

melodic part of a close was, for a long time, as stereotyped as the harmonic, and such passages as—

we are apt to regard as disfigurements to fine old works, on account of their too frequent occurrence, forgetting that these were in their day the recognised and only means of drawing the attention of the unsophisticated auditor to the fact that *here* was a close—much as in old times the conclusion of each scene in a play was emphasized by a rhymed couplet.

Modern composers of what is called the romantic school have been the chief inventors of new closes, and this seems only natural when we consider that the romantic impression is chiefly conveyed by the element of the unexpected. We therefore look to the works of Chopin, Schumann, Liszt, and Grieg for the more unusual forms of closes, and there, indeed, do we find them in greatest abundance. Chopin did not invent any new harmonic progressions, but melodically and rhythmically his endings are startlingly original. Grieg's melody is utterly simple and child-like, his rhythm conventional to a fault, but in the matter of new and dazzling harmonies he is utterly unapproached. Liszt—well, one must not criticise his music; but his closes are usually more bizzare than beautiful, and many of his novelties will certainly never be plagiarised. It is curious that Schumann, who protested against Chopin's ending one of his Mazurkas with a first inversion of the tonic chord, should himself have perpetrated one of the greatest atrocities in the way of a close that I have ever come across. This is at the end of his "Humoreske" (each movement of which, by the way, ends with a startling novelty), where he writes this progression several times over—

but I believe Schumann must have the credit of first using the higher dominant discords and their inversions in cadences. He has also a very curious case of apparent modulation in a close—

This, indeed, might well be called a deceptive cadence.

Another far more beautiful instance of apparent modulation at a close I may quote here from the first soprano solo in Dr. Parry's noble work "Judith"—

One close I know of, to which none but the name of interrupted cadence can apply, that is at the end of the "Oro supplex"

in Verdi's Requiem, when the "Dies Iræ" breaks in upon the bass solo in quite another key—

This always makes you jump, even when you know it is coming.

I have said that every note of the chromatic scale has been used as a bass note for the penultimate chord. Let us now glance at a few of the more unusual cases. The minor supertonic has been effectively used with a major triad by Grieg, thus—

GRIEG, Op. 42 (*Reisemjndr*).

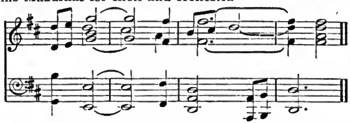
and frequently by Schumann with a chord of augmented sixth. The major supertonic is more rare, because the tonic chord does not sound well after a common chord on the second degree; indeed, Macfarren forbids the progression entirely. Also the seventh of the supertonic is the keynote itself, and therefore cannot appear in the two successive chords without the fault of oblique motion to the same note. Nevertheless Lassen ends his fine song, "Wie durch die stille Mondenacht," thus—

LASSEN (Op. 65, No. 2).

and Grieg in his weird little song "Geschieden" obtains a sombre effect by the use of the same chord with (chromatic) major third—

The diatonic common chord on the major mediant is regarded as a discord by some theorists, and is in any case little used. Curiously enough, Dvořák has chosen it for the final cadence of his "Spectre's Bride"—

A more curious, but not so effective, use of this close is made by the clever Polish composer Sigismond Noskowsky, in one of his Mazurkas for choir and orchestra—



The (chromatic) major common chord on the mediant is very effective, and now not uncommon. Concerning the major subdominant chord in the minor key I have already spoken, but I may remind my hearers of a beautiful recent instance in the slow movement of Dvořák's new Quintet—

Grieg has also used it thus—

Gounod is generally credited with the invention of the chord which he writes as an augmented sixth on the subdominant, but which is really an inversion of a chord of major ninth and minor thirteenth. On theoretical grounds the late Sir George Macfarren used to prohibit this chord and call it an abortion, but it is undeniably beautiful and is therefore generally accepted now. Gounod's use of it in the prelude to "Faust" will be easily remembered, but Grieg has used it in the minor key, and also invented a new resolution for it which deserves mention here, for though not a penultimate chord it is yet part of a close. To express the utmost poignancy of grief in his song "An der Bahre einer jungen Frau," he writes—

The augmented fourth from the keynote is not at first sight a practicable bass for the last chord but one, still less the diminished fifth, yet I have met with some powerful instances of closes so based, and have even perpetrated them myself—if that is anything. The following is from a pathetic little piece by Liszt, called "Heimweh"—

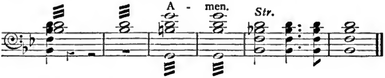
And Grieg ends his Violoncello Sonata with the following astounding cadence, of which I am forced to quote the whole to make it intelligible—

This threefold cadence, each time growing bolder and bolder in its progression, is one of the most remarkable things I have encountered, even in the works of this remarkable man, who, were he only as great a composer as he is a harmonist, would claim universal and complete homage.

I cannot find many novelties worthy your attention in the way of dominant closes, but yet there are one or two which must not be passed over. The first is from Gounod's "Mock Doctor," the droll "Bottle Song" of Sganarelle, which he ends with a pretty use of the dominant minor thirteenth and third—

and the second from the inexhaustible Grieg, who is certainly the only composer who has yet used the *minor* chord of the dominant. The finest instance of this is in his song "Der Wald," where it occurs twice, the second time—at the end—with wonderful effect—

The minor and major sixth will bear a variety of chords for cadential purposes, but the only one I shall bring to your notice is an atrocity perpetrated by Verdi in his Requiem at the end of the "Dies Iræ." The key is B flat, but for the *Amen* he jumps to a chord of G major with the chorus in unison on G, and then the orchestra alone jumps back to a chord of B flat. The effect is most unpleasant, the G ringing in one's head through the last chord—



Gounod in his "Mors et Vita" uses, amongst other queer things, the following pair of chords, but without rhyme or reason that I can see—

Modern composers have made some interesting innovations by disregarding the old rule that the chords of a major key must be kept distinct from those of its relative minor. As we have seen, they have used a major and minor sixth and seventh in both major and minor keys, and they have also used the dominant seventh chord of the major key in the

relative minor. A very lovely instance of this occurs in Dvorák's song "Gute Nacht," in which the close is always uncertain whether to go to G major or E minor, finally ending thus—

These are only a few of the most striking examples of closes in modern music. Of mere monstrosities, like many invented by Liszt, it is needless to speak, and it is not more necessary to dwell upon those cases where a piece of music concludes on any other than the tonic chord; for by our definition they cannot be said to close, any more than the poem recited by Humpty Dumpty to Alice, which ended, as you may remember, on the word "but." Yet Schumann has concluded several pieces on the dominant chord, and even the dominant seventh, while Grieg, not to be outdone by anybody, ends his "Folksong from Langeland" on the subdominant, and a pretty piano piece by an Englishman of talent calling himself Florian Pascal has the really quite too terrible ending of a chord of major seventh on the tonic. But I ought perhaps not to ignore the larger forms of closes, those which extend over a series of harmonies, and, consequently, a number of bars. But these are not common property, and a beautiful specimen of such only excites a feeling of regret that we may not use it. Take, for instance, Gounod's two lovely inventions: this, from the *Entr'acte* to "La Colombe," and dozens of other places—

and this noble climax to the final prayer in "Cinq-Mars"—

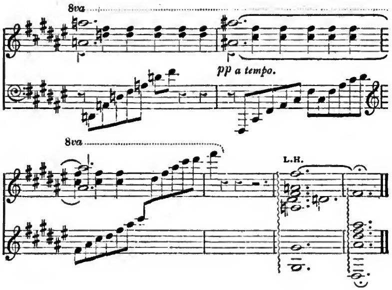
One can hardly believe that the writer of this splendid progression is the same man who wrote this hideous series of chords in the Epilogue to "Mors et Vita"—

Now it may be asked why have I troubled you with this collection of unusual harmonic experiments, with many of which you are probably familiar, and what moral, if any, do I deduce therefrom? Simply this: I desire to point out that while it may be said to have been traditional with composers up to the time of Schumann to use none but the conventional harmonic endings, we moderns, in our feeble search for new ground, have at least hit upon one legitimate novelty. We have perceived, in common with the modern dramatist—who is also but a feeble and degenerate creature—that the end crowns the work, and that even a weak composition can be enormously enhanced in value, provided it end with a poetic climax, or what they call on the stage a "curtain." Of course, in vulgar hands, such as those of the mere singer, this may easily degenerate into vapidity or clap-trap, as we may see in the invariable high note with which every modern ballad is forced to end, and I do not say that all of the closes I have quoted in this paper are legitimate; all depend upon the circumstances under which they occur; but I maintain that *we* have got hold of one new truth ignored by the old masters. With all our love and reverence for Beethoven, who will deny that the endings of his C minor, Eighth, and Ninth Symphonies are sore trials to our æsthetic taste? The end of the *Allegretto* of number eight, too, jars sadly upon one's nerves. True, it is intended as a joke, but it seems a

pity to disfigure this charming movement with so doubtful a specimen of humour. With all our weaknesses we could not perpetrate such incongruities now-a-days. We produce vast quantities of music, mostly bad, but now and then a little good. It seems that constructively we may add nothing to the edifice reared by Beethoven, but what little we do achieve is in the way of improved detail. Modern subjects refuse to develop or work out, but modern harmony, controlled by good taste, offers us some excellent opportunities, especially for novel and poetic endings. In proof of this let me conclude by playing you two of the most beautiful extended perorations I know of; one is from a little pianoforte piece by Grieg ("Lyrische Stückchen," Bk. III., No. 6) and the other from that pearl of modern music, the "Siegfried Idyll" of Richard Wagner—

GRIEG (Op. 43, No. 6).


cres. molto.
f sostenuto.
8va
ff rit.
p a tempo.
8va
rit. poco a poco e dim.



"SIEGFRIED IDYLL."


più p
molto tranquillo.
L.H.
una corda.


Piu lento.
sf
sf

DISCUSSION.

THE CHAIRMAN.—Ladies and gentlemen, I hope that there may be a very instructive discussion on the subject of these Closes; but I think our first duty is to pass a very hearty vote of thanks to Mr. Corder for the immense trouble he has taken in preparing this very interesting paper. [The proposition was carried by acclamation.]

MR. HOPPER.—May I ask one question, Mr. Corder? Did you say there was no case of the supertonic chord being followed by the tonic chord in a close?

MR. CORDER.—Oh, no; I gave two instances; it is by no means uncommon.

MR. HOPPER.—There is a very well-known case in Gounod's Mass in G.

MR. CORDER.—It is a favourite ecclesiastical effect.

The CHAIRMAN.—Before we commence the discussion, may I ask Mr. Corder to give us again the cadence from Dvořák, which he said was formed by the mediant? [The illustration was given.] That occurs to me as not being the mediant, but the *submediant.*

MR. CORDER.—So it is, you are quite right, though I never thought of it. I am sure I had an instance of the mediant. I must apologise for the absurd blunder, but I had such a tremendous list to choose from that probably I put down the wrong one.*

* On reference to my notes, I afterwards discovered that the quotation I should have made was from the preceding number of the "Spectre's Bride"; but a better instance is the "Götterdämmerung Motive," of Richard Wagner. —F. C.

The Chairman.—I think Mr. Corder has dealt rather with exceptional matters than with the theory of cadences in general, assuming, I suppose, that ordinary cadences are so familiar to us that they were hardly worthy of being treated in the paper. Nevertheless, there are, I think, some very important matters to be mentioned in connection with them. I would particularly refer to the too frequent employment of cadences in music. I adduce the late Sir Sterndale Bennett as one who had a great horror of such constant closes, more particularly of that of the perfect cadence. The early writers of treatises on counterpoint were correct, I consider, in their denunciation of a close before the actual end of a piece, and this is one of the few things they have left which I think deserve our very careful attention. Some of the composers of what is, by many, considered the brightest period of our church music, fell very much into the error of too frequently repeating the same cadence, and there is a work very familiar to all of us, the Te Deum in A, of Dr. Boyce, which is a strong instance of this. I believe I am correct in saying that in the course of a very few pages he closes at least half-a-dozen times in the key of A. This redundancy becomes offensive to an educated ear, and is, perhaps, one of the reasons why ordinary dance music palls on such. I call to mind an instance by the late Prof. Macfarren, in which he, having a special object in view, avoided a perfect cadence or close in the whole of his piece until the very last. That is the Overture to "St. John the Baptist," where he endeavours to prefigure expectancy of the Saviour, and yearning for Him, by the absence of a close in that work until just the very end. It is a point which might, I think, hardly strike the ordinary listener, but nevertheless, an inspection of the work shows that Prof. Macfarren has carried out the intention which he declared. I must say, with regard to many of the exceptional instances which Mr. Corder has brought forward, that I am very much obliged to him for calling our attention to them, but I can hardly class many of them as cadences at all. They seem in many cases like mere vagaries in harmony, neglecting every principle which conveys the idea of a close. I do not think that *any* two harmonies taken in succession can be so placed as to convey a satisfactory notion of a close; but it would take me too long now to go into theoretical matters to show that there are special things which conduce to that result. I do not consider that mere harmonies selected at random all over the scale, and even dipping into reminiscences of other keys, can produce the satisfactory effect to our ear that the recognised cadences certainly do, and when Mr. Corder says there are about eighty varieties of cadences—that, I think, was the number—

Mr. Corder.—There are eighty-four, I think, possible chords.

The Chairman.—I should be strongly disposed to think that many of them are not satisfactory in the light of cadences. We can indulge in any amount of extraneous harmony in the course of a piece, but I think that to bring any piece to a climax there are certain conditions absolutely essential, without which there is not the feeling of a satisfactory close. Not having had the opportunity of knowing the lines on which Mr. Corder was going to address us this evening, I, of course, was not able to prepare any examples to illustrate this little difference of opinion. His research in the matter has been very great, and it would require an equal amount of research to produce examples in other directions; but I take it he acknowledged that some of the examples he has given hardly merit our approbation. I do not take it that he has approved of every example he has presented. On the contrary, some of them, in common with myself, he feels to be eminently unsatisfactory. I think that the young composer, and even the more experienced composer, ought not to look on this as a subject which he can treat with the apparent disdain that some of those composers have done whose specimens have been submitted to us. I think there are elements of our art which we ought to treat with conservatism, and that a perfect cadence, notwithstanding any amount of beautiful things which may be suggested in its place, is, after all, the most satisfactory conclusion to a piece of music.

Dr. Vincent.—I should like to ask Mr. Corder if he knows any example of an important work, such as an oratorio or a large symphony, ending in any other than the orthodox way?

Mr. Corder.—One may say that there is rather a dearth of important works lately, and all these things I have cited are absolute novelties.

Dr. Vincent.—But when they are in a cycle of songs, which I suppose is intended to be performed together, one would come to a regular close at the end.

Mr. Corder.—The examples I have quoted were from single songs, not in a cycle; they were all separate songs and separate endings, but there is a great difficulty in giving these quotations apart from the context where the thing works up to a climax. Probably on hearing the whole piece everyone would feel in this unusual poetic ending a certain sense of exaltation at the end, which would not be obtained by the more ordinary perfect or plagal cadence.

Dr. Vincent.—I had a song shown me in print the other day which ended on the dominant seventh unresolved. But the words of the song left you in the same unsettled frame of mind—the last word was "where."

The CHAIRMAN.—A song of Liszt's ends in the same way—and others.

Dr. VINCENT.—There is a well-known example of the final chord ending without the third which is, perhaps, interesting, though not unusual.

Mr. WINDEYER CLARK.—Would it not be interesting to know how many of the audience had a sense of close in the examples Mr. Corder played? I thought very often another chord might just as well have come, or that if one of them had been left out we should have been in the same place.

Mr. CORDER.—Scarcely, I think, if you had heard the whole piece. That is the weakness of playing detached phrases.

The CHAIRMAN.—It must be understood, in justice to Mr. Corder, that these examples which he has presented have the great disadvantage of incompleteness; but there is also the fact that many of them are illustrative of the peculiar composition of the time.

Dr. VINCENT.—I think you do not feel a sense of close in a piece simply because there are dominant and tonic chords occurring in succession. When the Overture to "St. John the Baptist" avoids the perfect cadence it must be remembered that it is not every perfect cadence or following of the dominant by the tonic that gives the feeling of a close; I think it must be taken in connection with rhythm.

The CHAIRMAN.—Certainly.

Mr. CORDER.—That is what I say. There are three elements in music which must be considered together in the close. The harmony may close as often as it likes, leaving the melody and the rhythm going on, and there is no sense of finish.

The CHAIRMAN.—There is no prohibition of dominant and tonic harmonies following each other in the course of a piece irrespective of the closes.

Mr. CORDER.—Perhaps the most extraordinary instance I quoted was that last little piece of Grieg; but you cannot say that that does not sound like a satisfactory ending.

The CHAIRMAN.—No, certainly not.

Mr. W. CLARK.—That was because we heard more of the piece before it, and had the key stamped on our minds.

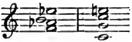
Mr. CORDER.—Certainly, that is why I played the whole context. He goes through a series of very extraordinary chords there. [Mr. Corder again played a portion of the piece referred to.] You could not have a more extraordinary series of chords than those, and yet the sense of finish is complete.

The CHAIRMAN.—I think the notes at the end are rather an adjunct than a cadence.

Mr. CORDER.—It is a recognised cadence, the so-called augmented sixth on the subdominant.

Mr. W. CLARK.—I think that same cadence occurs in the C movement in Brahms's Symphony in F.

Mr. CORDER.—It is not at all uncommon to have the subdominant chord F, A flat, B natural, E flat, and then the tonic.



Dr. VINCENT.—I think I have heard it stated in this room that it is very exceptional to find a plagal cadence in the minor key.

Mr. CORDER.—The exceptional thing is a major subdominant chord in the minor plagal cadence. [Giving an illustration.]

The CHAIRMAN.—That is very ugly, that is all I can say. I will now ask Mr. Corder to reply.

Mr. CORDER.—I really have very little to reply to, for I think Mr. Stephens has filled up some of the more obvious lacunæ in my paper of which I am quite sensible, but time would not allow me to make it so thorough as I could wish. There is very much to be said on the subject that I did not touch. My object was chiefly to call attention to some of the more unusual modern forms of Closes, and I can only repeat that it is the regrettable absence of the context that renders many of the examples less conclusive than I could wish.

Dr. VINCENT then proposed a vote of thanks to the Chairman, which concluded the proceedings.

FEBRUARY 4, 1889.

DR. J. FREDERICK BRIDGE, VICE-PRESIDENT,
IN THE CHAIR.

MATTERS, CHIEFLY ARCHITECTURAL, RELATING TO THE ACCOMMODATION OF THE ORGAN IN CHURCHES AND OTHER BUILDINGS.

BY GEORGE ASHDOWN AUDSLEY, F.R.I.B.A.

A FEW months ago I had the pleasure of meeting your distinguished member, Sir John Stainer, at the breakfast table in the principal hotel in Cambridge; and in the most natural manner possible our conversation drifted into the subject of Organs. As a matter of consequence, seeing that I am a member of the architectural profession, Sir John Stainer feelingly enlarged on the only too obvious shortcomings of modern architects in all matters relating to the accommodation of organs in churches. Perhaps to his surprise he found in his listener a warm supporter in every word of condemnation he uttered, and, indeed, if I remember rightly, I used even stronger language than he, doubtless through kindliness of feeling if not through a certain respect for my calling, ventured to give expression to. Well, it is to this little incident that I have to attribute the kind invitation to occupy my present position to-day, and the honour and privilege of addressing you on a subject of no little interest to all lovers of church music.

In addition, however, I feel that some apology is due for my venturing to read a paper before so important and learned a Society as this on a subject in any way connected with music; for, alas, I am no musician, in the true sense of the word, although in admiration for musical genius and intense love for music I am not prepared to "play second fiddle" to anyone.

On the present occasion I confine myself to a subject on which I may, without much presumption, occupy your attention for a short time; my chief credential, beyond my

professional one, lying in the fact that I have been an ardent student of the Art of Organ Building for about the quarter of a century.

The chief difficulty I have experienced in preparing my paper has been the desire to avoid trenching, to any important degree, on the interesting and admirable paper read before this Association in February, 1886, by your talented member, the Rev. Sir Frederick A. Gore Ouseley, "On the Position of Organs in Churches." I have, however, done my best in this respect as in all others, and can only crave your kind and courteous indulgence in all my only too obvious shortcomings.

If the present Paper provokes an instructive discussion—and it would be difficult for any discussion to take place in your Association which would fail to be instructive—probably the chief end of such a Paper will be gained.

I shall first direct your attention to the architectural matters relating to the accommodation of organs in ancient churches, and shall conclude with a few remarks on the same question with respect to modern ecclesiastical structures and other buildings.

It is well known to you all that considerable difficulty has been experienced by modern organ builders and architects in finding suitable positions and adequate accommodation in our mediæval cathedrals and large churches for the immense organs which nineteenth century skill has developed, and musical authorities of the present epoch deem necessary. How far such immense instruments are necessary or even advisable under existing circumstances may well be discussed; and I shall have a few remarks to offer on this subject, with the view of eliciting expressions of your opinion upon it. It is highly probable that you have often asked yourselves why there should be so great a difficulty in connection with the accommodation of organs, of any desirable dimensions, in our cathedrals and important parish churches? The question is, however, easily answered; and in the obvious answer lies the whole sum and substance of the matter. Our cathedrals and mediæval churches were never designed for the reception of such organs as modern requirements have created and are now considered indispensable. During the Middle Ages—that great church building epoch in which all the magnificent Romanesque and Gothic ecclesiastical edifices were constructed—no difficulty beset the now vexed problem of the proper position of the organ, simply because the largest instruments then fabricated were extremely insignificant in proportion to the vast buildings in which they were placed; and could, accordingly, be accommodated in any desirable situation, or moved from one place to another as require-

ments dictated. The smaller organs were portable, and were not only moved about inside the churches to which they belonged, but, on certain occasions, were transported from one church to another. In no instance with which I am acquainted does a mediæval church present an original and specially constructed place for the reception of an organ.

We have little or no information upon the mediæval usage in the matter of the organ; but we may reasonably surmise that where the singers were there the organ would be also. This rational arrangement would conclusively point to some convenient situation on either side of the choir or chancel, or probably, in some isolated cases, to a central position eastward of the high altar. It is reasonable to suppose that in cathedrals and large conventual churches the principal organ was practically permanently located in one or other of the places I have mentioned; while the small organs—*Regals* or *Portatives*, as they were called—were doubtless carried from chapel to chapel, either to give out or support the melody of the plain song, or in some way assist the voices during the services at their respective altars. The records of York Minster distinctly mention an organ at the altar and a larger one situated in the choir.

When one ventures to argue that even the largest church organs made during the Middle Ages were, at the best, extremely circumscribed and primitive affairs, and limited to the last degree in musical resources, one is referred to that unknown quantity—the "monster organ" of the monastic church of Winchester, as poetically described by Wolston the Deacon. In respect to this, it is only necessary to remark that the description points to an instrument of extremely limited powers, musically considered, however complex and cumbersome its bellows arrangements may have been. It is to be regretted that Wolston gives no hints as to where this organ was placed. Wolston wrote prior to the year A.D. 963, the year of his death.

It appears certain that previous to the fifteenth century the accommodation of the organ was a matter which presented no difficulty either to architects or clergy; but as the instrument assumed more importance in its dimensions, and became a more necessary adjunct to the services of the Church, its proper position began to exercise the minds of all interested. At this period, however, organs, as a rule, were too small to require any special provision to be made in churches for their reception; and I am disposed to believe that a lateral position adjoining or within the chancel or choir, on the floor, continued to be favoured—at least, when the church contained only one instrument.

Some interesting particulars are to be found in the "*Ancient Rites and Monuments of the Monastical and*

Cathedral Church of Durham," compiled by Davies, and published in 1672. We find the following information anent the positions of the three organs once in that grand church :—

"There were," says Davies, "three pair of organs belonging to the said quire. . . . One of the fairest pair of the three stood over the quire door, only opened and play'd upon on principal feasts, the pipes being all of most fine wood, and workmanship very fair, partly gilt upon the inside and the outside of the leaves and covers up to the top, with branches and flowers finely gilt, with the name of Jesus gilt with gold. . . . Also there was a lantern of wood like unto a pulpit, standing and adjoining to the wood-organs over the quire door, where they had wont to sing the nine lessons, in the old time, on principal days, standing with their faces towards the high altar. The second pair stood on the north side of the quire, being never play'd upon, but when the four Doctors of the Church were read . . . being a pair of fair large organs, called the cryers. The third pair were daily used at ordinary service." Where this third organ (probably a *Portative*) usually stood, Davies does not inform us. The first mentioned "pair of organs" evidently stood in the centre of the rood-loft. Bentham, in his "*History of Ely Cathedral*," gives an inventory mentioning "two paer of organs in the quyer," and "a paer of organs in the Ladye Chaple." Storer, in his "*English Cathedrals*," tells us that in the Cathedral of Worcester the Chapel of St. Edmund had a pair of organs; that another pair stood in the Chapel of St. George; whilst the great organ was in the choir. We know for a fact that the rood-lofts, strong and spacious as they frequently were, were not originally designed to receive an organ of any kind, although, as time passed on, and the instrument began to be something more than a simple *Regal* or *Portative* (such as one sees in an interesting late fifteenth century engraving by Israël van Mecken, or in the still more instructive woodcut of "Music personified" in the Strasbourg edition of the work entitled "*Margarita Philosophica Nova*," published in 1508), it seems that the rood-loft sometimes numbered an organ amongst its more legitimate pieces of furniture. In the accounts of the Parish Church of Louth there is mention made of the purchase, about the year 1500, of a pair of organs of Flemish manufacture, suitable for erection in the rood-loft of that church. It is probable that it was about this date that the "wood-organs" mentioned by Davies were placed, adjoining the ambon, on the rood-screen in Durham Cathedral.

The cathedral and church builders of the Middle Ages, as I have already said, never, even in their wildest flights of musical fancy, contemplated the possibility of such immense and cumbersome instruments being introduced into their

buildings as now find some sort of accommodation there. Had the Gothic architects had such organs to accommodate they would most certainly have devised proper places for their reception, and those just where they were required by the musical services. Whilst I gravely doubt whether they would have adopted any central position as a matter of choice, I am convinced they would have planned specially for the organ, and, accordingly, have given the interiors, and in all probability the exteriors also, of their noble cathedrals and churches additional features of beauty and interest. Unlike the generality of the architects of to-day, the mediæval architects never ignored nor neglected any article or matter of utility; and had large organs, with such complete mechanical resources as our instruments possess, been known in the twelfth, thirteenth, and fourteenth centuries, we should find little cause for diversity of opinion anent their proper position in our large churches to-day.

I have, in my hours of study of mediæval architecture, endeavoured to throw my mind back to the thirteenth century, and to imagine myself a church builder of that great period of ecclesiastical art, face to face with the problem of having to properly place, and find adequate accommodation for an organ of, say, 5,000 pipes, the longest of which is to be about thirty-two feet. Such a problem certainly never presented itself to the great mediæval architects; and, accordingly, one finds nothing in their buildings which clearly guides one to the exact manner they would have set to work to solve it; although the student who, in a loving spirit, studies their works and their modes of overcoming difficulties,can see a light on the subject where darkness may reign supreme to the superficial observer.

I am not going to drag you through a labyrinth, in the shape of an architectural disquisition, or to confuse you with a string of technical terms; but I crave your indulgence while I briefly draw, in words, just one of the conceptions which have presented themselves to my mind in studious moments.

I have imagined myself called upon to design and build such a Cathedral as that of York or Ely, in which choral services of the grandest nature are to be held, and in which the largest and most perfect organ is to be placed that the mind even now can well realise for the support and accompaniment of a glorious choir, occupying stalls situated in their correct ritual position. I have proceeded well with my work; and my design, on clearly defined traditional lines, has so far developed as to provide for everything necessary for the sacred offices of the Church. The rood-screen, with its loft bearing the Holy Rood and its usual ritual fittings, spans the eastern limb of the building, enclosing the extensive

ranges of choir stalls with their high tabernacled screens; the sacrarium, with its high altar and other furniture in complete form and order, extends eastward of the noble choir; and westward, outside the rood-screen, stretches the lofty echoing nave and spread the spacious transepts. Yes, everything is provided and in order as in times past, but still the immense organ is unprovided for. This is a new and strange introduction which, I remark—in my capacity of thirteenth century architect be it remembered—my predecessors have never had to contemplate in preparing the designs for their churches; so, accordingly, it has to be treated entirely on its own merits. The matter demands careful consideration. The organ is required to accompany and support the voices of the choir, and its tones must combine with those voices in the most intimate manner possible, so that when heard from either a short or long distance there may be perfect unity in the musical effect to the ear. The proposed organ is of great size, and, accordingly, requires considerable floor space to stand upon and great height for its immense pedal stops and the superimposed manual departments, for it is desirable to avoid giving any portion of the instrument anything approaching excessive depth. And, lastly, it is desirable, if not absolutely necessary, that the organist shall be so placed that he can identify himself with the singers in the choir, and at all times perfectly realise the effect he is producing by his organ accompaniment and by his less important voluntaries and other incidental music.

Returning to the design of the Cathedral, I may remark, that so far as it has been carried out on traditional lines, it comprises in addition to the main portions already mentioned, lateral aisles, and above them the usual low-roofed triforia, and higher still the range of clerestory windows; but it is quite obvious that neither the aisles nor triforia are suitable for the accommodation of so vast an instrument. The aisles must not be obstructed at any point, and the triforia are altogether unsuited for the reception of an organ of any pretensions. The space between the rood-loft and the vaulted roof of the choir could, of course, be filled with the instrument, but there are three objections to placing it there. Firstly, the rood-loft is required for other purposes, and is already occupied with its proper furniture. Secondly, the organ if placed there in a complete form, would completely shut off the eastern limb of the cathedral from the rest of the interior. Thirdly, the organ would be badly placed at the extreme west end of the long choir, and between the voices and the nave, for there it would separate itself in a very objectionable manner from the voices and assume undue prominence. Its tones would be sent from its east and west fronts in diametrically opposite directions. I am, on account of these

reasons, compelled to abandon all idea of locating the organ on the rood-screen.

It is quite obvious that a new and special accommodation must be provided for this grand organ; and all the required conditions seem to point to one treatment of the choir, architecturally. As a thirteenth century architect, I must of course do everything in a very practical and highly artistic manner; and I must not only save the architectural appearance of my building, both internally and externally, but so press the organ itself into the service as to render it a beautiful and highly decorative feature in the interior.

I may say, in my matter-of-fact nineteenth century capacity, that I regret being unable to find time to prepare drawings in illustration of my paper, and can only hope my words may be clear enough for you to follow my meaning.

Slipping into my thirteenth century skin, and, in all probability, a sober monkish garb as well, I return to my cathedral design. I find that it presents a choir of five bays, eastward of the central tower or crossing. You understand a bay to mean the portion embraced between two pillars or piers of the main arcade on each side of the choir, and extending from the floor to the top of the vaulted ceiling. A bay on either side, accordingly, comprises a main arch, the division of the triforium immediately over it, and the division of the clerestory, with its window, directly above that. It also comprises the portion of the side aisle adjoining, and the span of the main vault above the division of the clerestory. I have remarked that my design presents a choir, or place where they sing, of five such bays on each side. All along these bays are ranged the stalls or seats for the singers, backed with screens of high tabernacled work.

It is quite evident that the proper position for the organ is directly adjoining the stalls, and as nearly in a central locality as possible, so that none of the singers may be too far away from it. The instrument is, however, much too large to be accommodated anywhere on the floor of the choir, in the adjoining lateral aisles, or in an elevated position above and overhanging the stalls, and so obstructing the view and interfering with the open nature of the choir. Under these circumstances, it is obvious that special accommodation must be provided for the organ, and that without in any way interfering with the choir or its aisles. So I erase from my design both the triforium and clerestory of the central bay on each side of the choir, leaving untouched the main or lower arches and vaulted ceilings of the adjoining aisle bays. Where the triforium and clerestory originally were I construct a lofty arch, on each side of the choir, and directly opposite each other, rising from what was the floor of the triforium and finishing immediately under the main vaulting.

Then I form behind these arches chambers of their width and height, by carrying up from the aisle walls tall gables and closing the sides with walls. I cover in these chambers with vaults or with arched ceilings of wood, suitable for the direct reflection of sound, and find that immediately above and in the centre of the ranges of choir stalls on each side I have a lofty and spacious recess, measuring about twenty feet square and forty feet in height, most admirably adapted for the accommodation of a large organ divided into two parts. I now design two beautiful traceried and tabernacled organ screens of oak, in perfect keeping with the rich stall-work below, fill them with polished tin pipes, and place them across and slightly in advance of the arches of the organ recesses. The lower portions of these screens fall in rich fringes of canopy work, with niches containing statues of angelic minstrels, connecting the entire composition with the tabernacled screens of the stalls. You follow me, I hope, in this simple description, and can picture in your mind's eye the effect of a choir, with a grand organ for the first time properly provided for, placed, and treated as an indispensable and integral part of the same.

I now turn my attention to the proper placing of the organist's seat and the claviers whereon he has to play. I mentioned in the earlier part of my paper that the organist should be so placed that he can identify himself with the singers in the choir, and at all times perfectly realise the effect he is producing by his organ accompaniments. No difficulty obtains in this matter as regards the question of mechanism, for it must be borne in mind that I have both electro-pneumatic and tubular-pneumatic actions at my disposal. Under these circumstances, I decide to locate the console on one side of the choir, directly under one division of the organ, and practically forming part of the choir stalls.

Seated here, with his face directed towards the choir, the organist is most favourably situated to judge of the effect of his accompaniments, and to assist the singers in any manner desirable. At all events, the organist is not relegated, as in too many modern instances, to an elevated and distant organ-loft, practically out of view of the singers, too close to his instrument, and in a position which renders it almost impossible for him to follow the refinements and *nuances* of the vocal music.

I have completed my task. I have designed the Cathedral; provided accommodation for a large number of singers; I have located a magnificent organ in the most appropriate position, without injury, artistically or practically, to the architecture of the building; I have greatly added to the beauty and interest of the choir by my two imposing and highly ornamental organ fronts or screens; and I have placed the

organist in a proper and logical position. Here, then, I may awake from my thirteenth century dream, and come to my senses and nineteenth century realities together.

I have only suggested one out of many ways in which the mediæval architect would have proceeded in providing sufficient accommodation for such organs as are at the present day considered necessary for our large churches. And when it is realized that so great a structural alteration from the usual plan of the mediæval cathedral is requisite for the adequate accommodation and proper placing of an important organ, such as that hinted at in my foregoing remarks, it must be obvious that it is by no means easy, even if it is possible, to find a suitable place and sufficient accommodation for a large organ in any existing cathedral or church which has never been designed for its reception.

I do not desire to weary you with anything approaching a disquisition on the vexed question of the position of the organ in our cathedrals; but as a fit conclusion to what I have already said, I venture to give you a few interesting particulars anent the question so far as the Cathedral of Canterbury is concerned.

Of the church which was erected by Lanfranc, between the years 1070 and 1089, we have a singularly precise account from the pen of Gervase the monk. He tells us that "in the midst of the church was a tower, like a centre in the midst of a circumference, supported by very large pillars. In the middle of the centre tower was the altar of the Holy Cross. . . . The great centre tower had a transept, called wings, both on the north and south side of it, and in the centre of each was a strong pillar, which received the vault springing in three parts from the wall. The south transept had an organ placed above the vault, and beneath it a portico, through which was an entrance to the east part of the church." It is not difficult, even from this brief description, to realise the disposition of the choir of Lanfranc's church. The high altar is placed under the central tower, and in the adjoining south transept is an elevated platform or gallery on which the organ is placed. Small as this eleventh century organ must have been, it occupied an appropriate and commanding position, close to where the services were sung. After Lanfranc's death, his successor, Anselm, rebuilt and adorned the choir, eastward of the central tower, giving the superintendence of the work to Prior Conrad. Gervase describes "the glorious choir of Conrad," but does not mention an organ therein. When this choir was burned in 1174, the central tower and the transepts were practically uninjured; and, accordingly, it is probable that the gallery in the south transept remained the organ-loft until this part

of the Cathedral was entirely rebuilt by Archbishop Sudbury in the end of the fourteenth century. It is believed that subsequently an organ was again placed in the south transept, on the large stone corbel which projected over the arch leading to the chapel of St. Michael, in the south-east bay. Dart gives a view in his "*History and Antiquities of the Cathedral Church of Canterbury*," published in 1726, in which an organ is shown within the fourth arch on the north side of the choir. Later than this an important instrument was placed on the rood-screen, as appears in Britton's plates. This authority informs us that the organ he shows in his work (1821) was the instrument originally erected in Westminster Abbey for the Handel Commemoration, and subsequently moved to Canterbury. In the year 1842 the organ was reconstructed and erected over the south aisle of the choir, the claviers being placed in the choir below. Of the position of the new organ little need be said here; you all know that it is a large instrument, of fifty-four speaking stops, packed into the choir triforium, whilst the claviers are placed in an elevated position, under the second arch on the south side of the choir. The action is electro-pneumatic.

In the opening sentences of my paper, it will be remembered, I remarked, in speaking of the immense organs which nineteenth century skill has developed and musical authorities of the present day deem necessary for our churches, that it may well be discussed how far such immense instruments are necessary or even advisable under existing circumstances; and now that we are brought face to face, so to speak, with the difficulties attending their adequate accommodation, this question may be profitably considered.

First of all we should clearly settle in our own minds what is the true office and what are the desirable limits of the church organ. Is it requisite that beyond being fully adequate for all purposes of vocal accompaniment, and for the solemn and soul-calming voluntary, it should be capable of lending itself to the rendition of florid orchestral compositions and other brilliant displays of the modern organist's skill? This question must be answered, one way or another, before the problem of finding room for and the proper position of the church organ can, in any satisfactory manner, be solved, either as regards ancient or modern churches. We of course agree that above all other considerations the true church organ must be essentially and fundamentally an accompanimental instrument. This is the reason of its very being—the sole apology for its introduction into the Christian temple. Need its capacity and office extend beyond this? Different answers will be given to this pointed question. Probably the thoughtful and conscientious musician and the lover of

strict church music will say *no*: whilst, on the other hand, the skilful and accomplished organist will say *yes*; for to him the organ is all in all—the theatre for his executive display, the exponent of his musical thoughts. As neither one nor the other I may safely take a medium course in answering the question. Above all and before all, let the church organ be perfect as an accompanimental instrument, furnished with all the necessary resources in that direction; then, if its position is favourable, available space for its proper accommodation is ample, and there is no danger of impairing its accompanimental properties, let any desirable additions be made that taste and musical knowledge may direct. It would be impossible to number the church organs which have been and still are being ruined through a wanton and ignorant neglect of this golden rule. The mania for crowding a large number of ear-tickling stops into a space or position which is, at the best, very badly adapted for the reception of an organ of the most limited dimensions, has destroyed nine-tenths of the organs which have been placed in our churches, ancient or modern. Had the designers of these organs been content to treat them in a commonsense manner, as accompanimental instruments with a well defined use and office, and to proportion them to the demands to be made on their musical resources, a fair measure of success would have been their reward. It should never be forgotten that a single, fine-toned Open Diapason properly placed, with perfectly unobstructed speech, is, for all practical purposes in relation to vocal music, worth a dozen half-hearted stops huddled together so as to be hardly able to speak or to be heard in the church.

A true accompanimental church organ need never contain many stops; but it is essential that its stops should be of the grandest kind art can produce. Dignity, purity, roundness, and volume should pervade its tonal structure, and full powers of expression should be provided throughout. I have long wished some musical apostle would arise and preach to unthinking and unbelieving organists some such doctrine as this; for it is not for a moment to be expected that organ builders will initiate or even encourage such a movement. It is to their interests to build large instruments, and the more stops the merrier; the final result is quite a secondary consideration, seeing that they are not paid upon that.

It is universally admitted, I believe, amongst all versed in matters of church music, that the organ used to accompany the choir should be as close as possible to that choir, so that perfect unity of effect may obtain. Well, taking this for granted, we surely see the advantage of so proportioning the instrument as to render it an easy matter to find accom-

modation for it where it is required; and that without objectionably blocking up churches which have never been designed for large organs, or demanding excessive provision to be made in new ones. Whilst I dispute the necessity of having large organs for accompanimental music, I preach no crusade against them when and where the architectural conditions are favourable to their accommodation, which conditions are very rarely met with in our churches. For important churches, why should the French system of having two independent organs not be adopted in this country? Let there be a thoroughly efficient choir or accompanimental organ provided close to the choir, and then let a grand organ, which may be large enough to rejoice the most ambitious organist's heart, be placed at the west end of the church or in any specially favourable position, and played by electricity from the single console in the choir. With such an arrangement one can be used for the special music of the services and the other for the congregational singing, grand voluntaries, and incidental music.

If time would permit I should be very pleased to go much further into the questions I have just touched upon; but, with a hasty glance at modern methods across the Atlantic, I must conclude this portion of my paper. Divided and distributed organs are becoming common features in American churches; and my dear friend the late Mr. Hilborne Roosevelt was the leader in this important movement. His marvellous skill as a mechanician, which in organ work surpassed that of any European organ builder who has ever lived, rendered his essays in the direction of divided and distributed organs matters of no difficulty. His sliderless, pneumatic-actioned windchests, his electro-pneumatic action, and his adjustable combination actions are the most perfect things to be met with in the entire range of organ mechanism; whilst the general excellence, structural perfection, and the workmanship of his instruments, down to the minutest detail, are unequalled by the work of any European builder known to me. A Roosevelt organ must be seen to be realised. The first instrument, by this builder, to which I shall briefly direct your attention, is that in the Cathedral of the Incarnation, Garden City, Long Island. In the spring of 1883 I had the pleasure of hearing and carefully examining this compound organ, and a few remarks may not be without interest to you.

The organ contains in all 115 speaking stops, amongst which are to be found the distinctive qualities of the English, German, and French schools of voicing. Speaking of such a combination, Mr. Roosevelt writes: "Experience shows that a perfect result can only be produced by utilising the desirable inventions that have been made by others, in con-

junction with such original improvements as may suggest themselves. In Europe," continues Mr. Roosevelt, "local prejudices hinder builders from using the methods of all schools, and combinations of systems in any one specimen are, therefore, not to be found. For some years past we have been gradually perfecting a distinctive class of organ building, which combines the best European features and adds many valuable triumphs, thanks to our practical application of science, which have never been accomplished abroad; and it is certain that we are rapidly reaching a point where the American school will lead the world in the art of organ building."

What most interests us on the present occasion, however, is the unique manner in which this instrument is divided and distributed. It is divided into four practically distinct portions, each of which occupies a special locality, distant from the others. The largest portion is placed in a space provided for it at the junction of the south transept and the chancel. This space, or we may call it a chamber, is fifteen feet each way, and extends from the crypt or basement upwards to the height of forty feet. This part of the organ is divided into floors or stories, the engine, countershaft, &c., being in the basement. Next above this, on a floor constructed of brick and iron, is to be found the bellows and also the windchest upon which rest the thirty-two feet pipes. On the next level is the Great Organ windchest, together with that for the reeds and mixtures of the Pedal Organ. Next follows the Swell Organ, and, uppermost of all, the Choir. The swell-box is so constructed that it includes the reeds and mixtures of both Great and Pedal Organs, thus affording to the swell pedal an effective scope that is seldom met with. The key-case is placed in the choir, slightly in advance of the arch between the organ and the chancel. Speaking of this choir or chancel division Mr. Roosevelt remarks: "A part of the Pedal Organ is to be found to the left of the organist, projecting into the choir, and also forming a corresponding projection on the opposite side of the chancel. The remaining Pedal stops of the chancel division project into the transept in front of that arch. In covering these portions of the Pedal Organ the case extends from a point about twelve feet to the left of the keyboards, around the angle formed by the intersection of the chancel and transept, to the extreme end of the latter, presenting a grand expanse, and completely hiding from view the two arches which connect the organ chamber with the interior of the edifice."

The chancel organ has eighteen stops in its Great department, fourteen in its Swell, ten in its Choir, and twelve in its Pedal; in all fifty-four speaking stops.

The second portion of the instrument is placed in the tower,

at the west end of the nave, and immediately above the entrance vestibule. The chamber is fifteen feet square, and of ample height to allow the Swell department to be elevated above the Great. In this tower division are parts of the Great, Swell, and Pedal Organs, and the entire Solo Organ. This division is played from the claviers in the choir; but it is also furnished with special claviers, in the tower, for tuning purposes or independent performance when required. The archway into the church has a screen, with gilded pipes, behind which are vertical swell shutters, which convert the entire tower organ into a large Swell department.

The tower organ has thirteen stops in its Great, thirteen in its Swell, seven in the Solo, and five in its Pedal department; in all thirty-eight speaking stops.

The third portion is located in the chapel underneath the cathedral, and is provided with claviers of its own in order that it may be rendered independently available for chapel services. It comprises a part of the Choir Organ, here divided between two manuals, and two of the Pedal stops. It is also commanded from the claviers in the choir above, and its tones ascend by the various staircases and have a mysterious and distant effect. This division has fifteen speaking stops.

The fourth portion is located above the ceiling, at the intersection of the nave and transepts. This division comprises the seven stops of the Echo Organ and one Pedal stop, a Bourdon of sixteen feet tone. Speaking of this small organ, Mr. Roosevelt says: "When it is sounding it is impossible to determine from where the tones emanate; and as they descend and pervade the entire space below, the fascinating impression made upon the listener is beyond description. In addition to the subdued and sweet character imparted to all the pipes by their remote position, the Vox Humana is rendered more imitative and realistic than is possible when otherwise located." Mr. Roosevelt continues: "Thus it will be seen that each division of the organ has its own special Pedal stop or stops, and as each is provided with its own swell-box, affecting the whole or part, such marvellous effects of *crescendo* and *diminuendo* as have never before been realised are easily produced. Owing to the position of each of these divisions, the distribution of sound throughout the entire building is absolutely perfect, and the most varied and faultless antiphonal effects are obtainable with facility."

Every portion of this unique instrument is controlled by one performer seated at the claviers in the choir; and any desirable combination of the separate divisions can be made at will. Three kinds of action are used—namely, pneumatic lever and tracker, tubular-pneumatic, and electro-pneumatic,

the last being used for the distant divisions. Time prevents my saying more anent this noteworthy organ.

One more example must suffice for my present purpose. In this case the organ is the work of Mr. Frank Roosevelt, the successor to Mr. Hilborne L. Roosevelt. It has been designed for Calvary Church, New York. The complete instrument contains eighty-four speaking stops and an unusual number of mechanical appliances. The organ is divided into two great divisions, one located in the chancel and the other at the west end of the nave. Both are to be played from one console, placed amongst the choir stalls on the cantoris side. First, as regards the chancel division—its Great department, comprising eleven stops, is placed on the cantoris side, and the Choir department, comprising eleven stops, is also on this side. The choir is enclosed in a swell-box which also contains eight of the Great Organ stops. The Swell department comprising fourteen stops, and the Pedal department of six stops, are located on the opposite or decani side. The chancel organ, accordingly, comprises forty-two speaking stops and two independent swell-boxes.

Now, with reference to the west end organ—its Great department comprises thirteen stops, its Solo department nine stops. These latter, along with ten of the Great stops, are enclosed in a swell-box. The Swell department comprises thirteen stops, and has an independent swell-box, and the Pedal department comprises seven stops. The west end organ, accordingly, contains forty-two speaking stops and two independent swell-boxes.

With the exception of the few pneumatic tubes, by means of which the shutters of the four swells are operated, all portions of both the chancel and west end organs are controlled by an electro-pneumatic action of the most advanced and perfect form. I dare not detain you with further details of this remarkable scheme, so I shall proceed with my concluding remarks.

We have seen that our ancient churches, restored, or in their Reformation rags and tatters, claim to be considered, each from its own standpoint, as regards the most favourable position to be occupied by the organ. This question must be decided by the architectural arrangements and the disposition of the plan in each individual case. We have also seen that a favourable solution of the question is rendered difficult from the fact that such churches were never designed for the reception of such immense organs as are now deemed necessary. And we have now to recognise the fact that as regards our modern churches, erected more or less closely on mediæval models, the problem at issue is scarcely less difficult, for their architects, in their enthusiastic imitation of mediæval models and their unreasoning love for precedent,

have practically ignored the requirements of the modern organ.

Why architects should give the organ so little consideration has long been a matter of surprise to many interested in ecclesiastical music, especially as it is unquestionably a most important article of church furniture. It is quite as necessary that the organ, as that the altar, pulpit, or font, should be properly placed with reference to the work it has to do. Apart from this, its case may be made a most beautiful and effective feature in a church interior. All who neglect the organ err both on utilitarian and artistic grounds. "The organ can go anywhere"—"Any sort of place will do for the organ"—are ideas and expressions which appear to have been, and unfortunately still are, too rife amongst church builders; and have almost invariably been acted upon when the slightest difficulty with regard to space arose, or when some peculiarity of site called for even a mild effort of skill and ingenuity on the part of the architect. I feel sure if you will recall to your minds such modern churches as you are acquainted with, you will find few, if any, which can be pronounced properly arranged for the reception of the organ.

It is very much to be regretted that our church architects so systematically neglect the organ—indeed, they seem to take credit to themselves for their total ignorance of even the rudimentary principles of its construction and the acoustical conditions necessary for its true beauty and utility. "A little knowledge is a dangerous thing," and in the case of a church architect a *little* knowledge of the organ would not be an unmixed good. In addition to an acquaintance with matters connected with its construction, and the dimensions of and space required for the proper reception of all portions of the organ, the architect should have sufficient musical training to enlist his sympathy in the cause of church music, and to induce him to exert every faculty towards the proper accommodation and location of the instrument upon which so much of the perfection of the musical services depends.

We must freely admit, I think, that the question as to the proper accommodation and best position for the organ in an Anglican church is not a one-sided one, and it can hardly be expected to be solved by any person who looks upon it from any one point of view. Such being the case, it must be obvious how necessary it is that a church architect should be to some extent an organ expert, a musician at heart, and to the very fullest extent a lover of church music.

As what I now wish to say has been better said by one of your own distinguished members than any words of mine could frame it, you will allow me to repeat what the Rev. Sir Frederick Gore Ouseley has already uttered in this room. He remarked: "It is evident that there are several various

and often conflicting interests to be consulted in the selection of a proper site for a church organ. There are first the interests of the clergy, who regard the matter, perhaps, from an ecclesiological point of view. Then there are the interests of the singers in the choir, who will view the question on its vocal side. Next we have the interest of the organist, who regards the position of the organ from a comparatively instrumental aspect. After him comes the architect, who chiefly looks at the appearance of the case, and too frequently hates the organ entirely, and would fain conceal as much of it as possible. Lastly, there is the organ builder, who knows how much better his instrument will sound with free space around it than when boxed up in a small chamber, and who feels that his reputation is more or less dependent on the decision as to locality to which those who have the management of the affair shall finally come. Here is, then, a fruitful source of quarrels and differences, of contentions and recriminations, of jealousies and revilings, of grumbling and discontent. It is really a matter of wonder that such occasions as the discussion of the position for a new organ so often pass off as amicably and peacefully as we find they do."

All this is most true, but the Reverend gentleman was too merciful to lay the blame on the most deserving person—the architect. In all matters relating to the accommodation, if not with reference to the position also of the organ in a church or other building, the architect is master of the position, and in exact ratio to his ignorance and disregard of the instrument will he fail in his duties towards it. Under such a state of affairs, how desirable it is that immediately a new church or concert-room is decided upon, the organ and its builder should be likewise decided on. Then let the architect call in the builder and consult with him in all matters intimately connected with the proper accommodation of the organ. And even under these favourable conditions it would be well to have a third mind on the question of position, in the form of a musician well versed in all classes of music.

As an architect, not unacquainted with church building and the art of organ building, I unhesitatingly affirm that the present practice of our church architects in connection with so important an adjunct as the organ is a disgrace to the profession. Let me give you two examples, well known to me from the works of two architects. One church was constructed by a man who took no special interest in the organ, and the other by one who has realised the true requirements and full importance of the organ in an Anglican church.

In the city of Liverpool stand two important and spacious churches, dedicated to St. Margaret, and capable of seating about the same number of worshippers. Between these a comparison may be instituted. In the first church we find

the organ placed on the north side of the choir, in a square chamber, with a low sloping ceiling just high enough to allow the sixteen feet Open Diapason of the Pedal Organ to stand erect, and with two arches, one towards the choir and the other towards the north aisle of the nave, of very moderate dimensions, the largest being about (to the best of my memory) ten feet wide by eighteen feet high. Both these arches are filled up with solid case-work to about seven feet from the floor, and with pipes above that.

In the second church we also find the organ placed on the north side of the choir, but in this instance it occupies a transept which measures twenty-two feet by twenty feet and fifty-five feet in height; the arch which opens towards the choir being fifteen feet wide by forty-eight feet high, and the arch towards the north aisle of nave being twelve feet wide by twenty-two feet high. It is obvious that here the organ has ample space in front, behind, and above it, and the thirty-two feet Double Open Diapason finds much more than the necessary height for its accommodation.

The first church was erected by the late Mr. G. E. Street, the famous church architect, and the organ was schemed and built by Mr. Henry Willis. The second church was built by myself and brother, and its organ was constructed by Messrs. Hill and Son, from my specification and under my direction.

English architects give, as a rule, too limited floor space for the organ, and they display far too constant a love for organ chambers, and, to make matters worse, they denude the chamber of every possible inch of height, or when the ceiling is fairly high they construct low arches so as to lock in the sound above to a most objectionable degree. All this is essentially stupid, to use no stronger term, and every exertion should be made by those interested in church music to have such a state of affairs altered, and architects compelled to give the organ and its accommodation proper consideration.

There is at present, and justly so, a great prejudice, in the minds of musicians and organ builders, against the very name of organ chamber; but this prejudice has been created by the blunders of architects, and the miserable holes in the wall they have, in far too many instances, been pleased to construct for the reception of the organ in their churches.

It must be acknowledged, however, that when anything approaching an important instrument is placed close to the choir stalls in a church of the ordinary dimensions, it must of necessity occupy some place of the nature of a chamber. Let the organ chamber be done away with in all possible cases, but when it is imperative let every care be taken to render it suitable for the reception of the organ. The conditions of a satisfactory chamber are as follows:—

Firstly, sufficient floor space to allow the organ to stand without the slightest crowding, and with enough space behind and at the sides to give easy access to all parts.

Secondly, ample height for the instrument to stand at the most favourable elevation, and yet leave considerable space above everything for the free emission of the sound from all its departments.

Thirdly, at least two arches or openings of the largest possible dimensions, the one towards the choir being carried up to the full height of the ceiling of the chamber so that no sound may be locked in above the organ. Whatever shape the arch or the upper part of this main opening may be, it is desirable that the ceiling should follow it closely, and, if possible, at the same level.

Fourthly, every precaution must be taken to prevent damp, and to secure an equable temperature within the chamber. For this end, the walls and ceiling should be lined with wood, tightly jointed, firmly nailed, and well painted or varnished. This lining will prove an admirable reflector of sound.

When the architect has attended to all these matters, it is incumbent on those who have to provide the organ to see that an instrument of the proper size and disposition is placed therein, and that its screens or fronts are not made so heavy and close as to check the free egress of the sound from the enclosed pipes.

In all possible cases, I should recommend the architect to plan for a divided organ, and to arrange for the accommodation of a reversed console in the stalls on one side of the choir or chancel. The very moderate depth required for the divided portions is, of course, highly favourable to good tonal results. If the cases are cleverly treated in perfect accord with each other a most artistic and beautiful effect can be arrived at.

Time will not allow me to say more on this subject, important as it is under existing circumstances; so I shall conclude with a very few words relative to the concert-room organ.

There is certainly less difficulty and diversity of opinion anent the proper position for the concert-room organ, and under ordinary circumstances the architect has no excuse for a bad provision for its reception. Great mistakes have, however, been made by architects who have displayed much skill and judgment in other directions. The hall of the Liverpool Philharmonic Society is allowed to be one of the finest concert-rooms, acoustically and architecturally considered, in the world, yet the provision for its organ is simply ridiculous. The instrument has had to be crammed into a

narrow, low, and deep chamber, from which the sound of the buried pipe-work can only reach the room through the narrow chinks between the front pipes which literally fill up the only opening of the chamber. The effect is that of a bee in a bottle, as might be expected.

Nothing in the shape of a confined chamber should ever be constructed for a concert-room organ, for, as this instrument is required for solo performances, and, in conjunction with the orchestra, for the accompaniment of the most important choral works, its voice should be perfectly free; and every tonal effect and *nuance* it is capable of producing should be heard with distinctness and at their full value.

The proper position for the concert-room organ is above and in the rear of the orchestra tiers, but here it should not be unduly elevated so as to have its pipe-work in the highest stratum of superheated air; neither should it be packed in a chamber nor massed together in a narrow and deep form so as to muffle its tones. The correct method is to spread the instrument laterally as much as possible, and give all its departments the minimum depth. Beyond the external screen, with its displayed speaking pipes, the several departments should have no obstruction in front of them. Under such favourable circumstances an instrument of moderate dimensions would prove more effective and satisfactory than any large organ built and located in the usual manner.

Finally, with reference to the situation of the claviers. I unhesitatingly affirm that not one of our great concert-room organs has its claviers where they ought to be. Perched high above, and far away from the orchestra, and usually with hundreds of voices between him and it, and probably half buried under a recess in the case of the organ, how is it possible for the performer to do his duty satisfactorily or with comfort to himself? Of course, when the ordinary tracker and pneumatic lever action was the best at the disposal of the builder, he naturally adopted the closest and most direct position for the claviers, and assured the organist that he must be content with his isolated perch, and to play with his back to conductor, orchestra, and everything save his organ keys. I need not enlarge on the inconvenience of all this. Now, however, when the most simple and perfect electro-pneumatic action is at our disposal, it is to be hoped the correct position of the organist and his console will be recognised and adopted. That position is immediately behind the conductor's desk, and the console should be reversed so as to place the organist face to face with the conductor. The console should be partly sunk so as to avoid an undesirable obstruction on the orchestra platform, and to allow a grand pianoforte to stand over it when necessary. The front central portion of the platform, on which the

conductor's desk stands, may be made to come to pieces, so that for organ recitals the entire console and the organist may be in view of the audience. Under such a condition of affairs, either in solo or concerted music, the organist has an opportunity of realising the exact effects he is producing. Surely this is a consummation devoutly to be wished.

Here my hasty notes must end, but not without a sincere word of thanks for your kind indulgence and patient attention.

DISCUSSION.

THE CHAIRMAN.—Ladies and gentlemen, having had the pleasure of knowing Mr. Audsley for some years, I believe that his knowledge of the organ and its mechanism, and his interest in organ building, are second to none. I must confess to a feeling of satisfaction that we of the Musical Association have an architect here who has laid about him in such an admirable way on his brother professors, and I think we should do well, when this paper is printed to surreptitiously convey copies to all the architects we know. I see an architect, a friend of mine, in front, and I have not the slightest doubt he sympathises with a good deal of what has passed, and will perhaps convey this suggestion of mine to the proper quarters. Of course, I am not going to say that in every point I can quite follow Mr. Audsley, and it is a very difficult thing to criticise a paper of such ability, and that covers so much ground. It is a question which has exercised many minds for a very long time. Organists no doubt do like to have a large organ, and I also feel that they are a little justified in rebelling against being condemned to having only an accompanimental organ. It seems to me that it would be very difficult with such an organ to do all that a really good and competent organist would wish to make the service glorious and effective. The mere accompanying of voices in an old monkish way will not do now-a-days, and no musician could long put up with the dulness that I am sure would come over his soul were he condemned to do nothing more than play a quiet accompaniment such as our predecessors used to put up with, such as, in fact, was almost all they could do. Their organs were small, their choirs were very small, and the music they sang was of a very limited character, and there was no opportunity for them to go out of their own particular sphere as mere accompanist to the singers. But now-a-days the music we have in the *répertoire* of the church is very different. Think of Wesley's "Wilderness"! What can an organist do to bring out the beauty of that magnificent composition on an

old-fashioned accompanimental organ such as we should be condemned to have if we are to make proper use of the very limited space provided? I know Dr. Wesley played that on old-fashioned organs sometimes, but I very much question whether he ever heard that anthem done as it should be done. I do not say never heard it played as it should be played, because we know what a magnificent organist he was, but I very much doubt whether he ever heard that done in any English cathedral on an old organ as well as it could be heard at St. Paul's, or at the Abbey, with their fine modern organs. I think, therefore, organists are quite justified in being very jealous of any attempt to reduce the class of instrument upon which they have to perform. I do agree thoroughly in all Mr. Audsley has said as to the desirability of placing the instrument in a proper chamber, and those admirable suggestions he gave at the end of the paper it seems impossible to gainsay. I do not myself look with much confidence on the division of a big organ into three or four pieces, such as he has described by that remarkable American builder. I can imagine that not only the sound would pervade the whole building, and that you would not know where it came from, but I think you would be rather glad if you *could* tell sometimes. I like an organ, I must say, divided in the chancel into two. We hear an admirable effect from that. There is an organ at All Saints', Margaret Street, which is divided; the organ is divided at St. Paul's; and it is divided at the Abbey into three portions, the middle portion—the choir organ—being midway between the other two, and not at a very great distance, so that the organ comes as one mass. The description that Mr. Roosevelt gives of his own organ has a little smack of spread-eagleism to me; I should rather like to have heard Mr. Audsley's opinion, and not the organ builder's own description of it. I have heard, although I have never had the pleasure of meeting him, that Mr. Roosevelt was a very enthusiastic and eminent builder, and I have no doubt that many of the experiments he tried were successful, and at any rate were in the right direction; but I do not believe that an organ can be split into four or five different pieces, placed as much as 100 feet from each other, and be as satisfactory as one instrument. Of course, if the church is to be treated as a mere organ case, or box to contain a number of organs, that is a different matter. There is another question that has nothing to do with the position of the organ, but as it was mentioned in the paper I may refer to it: I very much question whether the practice which Mr. Roosevelt has adopted of putting the Great mixtures and the Great reeds into the swell box can be at all satisfactory. I know one example of that where the Great reeds are placed

in a swell box, and I never heard a more horrible effect than when I ventured to use the same. Again, there is another point in connection with that organ, and that is enclosing the tower in swell shutters, and so converting the whole tower into one big swell. I also know a case of that kind in England, and with a terrible result. However, that has nothing to do with the main body of the paper.

Mr. Somers Clarke.—I have certainly heard with great pleasure the delightful way in which both organists and architects have been rated. As for the architects, they deserve it most fully, but I venture to think some difficulties arise from the fact that organists are so extremely determined to have the very largest instruments they can, quite apart from their being in a suitable building. One cannot but thoroughly agree with the view that a man feels he would like to have the best possible instrument he can to play upon, somewhat regardless of the exact conditions under which the instrument is to be used. Unfortunately, the architect does the same. He is ready to sacrifice a great many things to have the prettiest church instead of the most convenient. I think we ought all to work towards one end, and get everything in relation to the other as completely as possible. I venture to believe that great errors are made in enlarging the organs too much. I conceive that a thoroughly effective organ, and one in which interest could be given to the accompaniment, could be got with an instrument of perhaps forty stops, and there are a great many churches in which an instrument even of that size could hardly be properly put; but it would be better to have what we do have as good as ever it can be, rather than to have forty stops squeezed up into little cells and boxes. There is another point—so many of our organs have not to be provided for in a new church, but to be got into an old one. There are a number of new churches built, but there are very many more old ones in which we have to place organs, and I, at any rate, am entirely opposed to the notion that we are to chop holes in old churches to stick organs in. I think we ought to respect the old churches, and do our best to put as good and as suitable an organ as the building will accommodate. I think from that point of view we can arrive at some better conclusion than we generally do. My experience in dealing with the subject is that, to begin with, you must leave a good respectable place in which the organ ought to go, and should go to the proper expense to provide a separate place in which the bellows can be put. I think that the bellows and those things which create noise and not music should be kept as far as possible out of the way altogether; the public say, We cannot afford space, and so they will cut off everything that is really essential to giving room for the lungs

of the organ; and what is the use of an organ without good lungs? Then comes the musical amateur and says we must have an organ with huge pipes and sixty stops. If the architect knows anything about the matter he should say first, "You do not want it," and next, "You would not allow me to provide for what *was* wanted, and now you have to cram your sixty stops into a cellar, or something of that sort." I think if we could get a better co-operation between the architects and organists, and if the organists themselves would be a little less ambitious sometimes, better results would be obtained and the public would be better served.

Mr. SOUTHGATE.—I think we might well go on discussing this matter for a considerable time, and extract some amusement from it, although I do not know that it would be with very much advantage. I can hardly agree with our lecturer in the first view he took as to the non-necessity of having a large organ. It seemed to me that to a certain extent he clung to old church music customs, and did not recognise the present condition of matters. He naturally admired our grand glorious old buildings, and we can all quite sympathise with that; but with regard to the music of the church, it must be remembered that a very great change has come over it since the times when those old churches and cathedrals were built. Architects ought to recognise that, and be able on their part to meet that change and adapt their buildings to the wants of to-day. In the old time, undoubtedly, organs were simply used for accompanimental purposes, and they were to a great extent little more than a mere doubling or support to the voices. But now, in almost every new composition, you find more or less a great amount of complicated work in the form of *obbligato* accompaniment, which demands a large organ in order to properly portray it; and may we not go beyond that, and say that the organ is really a substitute for the orchestra? In ancient times we know there were orchestras in churches. I will not go back so far as the time of Solomon, who seemed to have had an immense orchestra of strings, wind, and trumpets—and one wonders where it was procured, and shudders at what a fearful row it must have made! An organ is practically a substitute for the orchestra, and if we were to say, "Very well, take away the organ that you architects find a difficulty in dealing with, and let us have a proper accompaniment for the voices in the support and colour afforded by a complete band," one would like to turn round and ask the architects where they are going to locate this orchestra. It must be remembered with regard to certain performances, which are now becoming more and more common I am glad to say—viz., performances of oratorios in churches, that the ancient home of the oratorio was the church, and from thence it got into the

concert-room, and I think the sooner it gets out of the concert-room the better. Now, if you are going to take the oratorio into the church again, you certainly require an orchestra there, besides a number of singers; I think architects will have a great deal of difficulty to find accommodation for this large body of performers. One would like to ask the question where these people are to be located, because that is a matter we shall have to face very soon. In any case you must certainly have an organ of a considerably larger size than used to be placed in churches ages ago. I have been to many churches (and I daresay most of you have) where, when some favourite hymn or chant was sung by the choir, the congregation joined in with all its strength, and absolutely you could hardly hear the organ at all. Possibly a small good organ may be sufficient for mere accompanimental purposes, but if the composer of some particular piece of music, or the organist, is inspired to do something more than merely support the voices, it is quite clear that he must have a large and varied toned instrument to do it, otherwise he cannot get those effects which modern music demands. With regard to the question of the divided organ, I tried to follow our lecturer's description of the very ingenious arrangement he proposed, which was it seems something like the position that one notes in St. Paul's Cathedral, only you propose to push it farther back.

Mr. Audsley.—No. The way in which I can most easily bring the idea to your mind is to refer to York Minster. You know the two double transepts—the central and eastern. Suppose that the small eastern transepts are projected from the middle of the choir, where the choir stalls are, and the organ placed on both sides within those transepts; that is briefly my proposition.

Mr. Southgate.—I take it the sound comes first into the chancel and then into the church through a large area.

Mr. Audsley.—Through practically unobstructed openings. There you could put a much larger organ than has ever yet been contemplated for a mediæval Cathedral.

Mr. Southgate.—Of course this plan requires a large space, and would cost a great deal of money; but I should think the plan is good, and the effect would be admirable; there would be plenty of room for the organ to speak, and it would be in a very convenient place. Respecting the suggestion that the organ might be divided into two or three pieces, of which you might place one portion in the chancel and one at the west end, I hardly think that the effect would be satisfactory. However cleverly your mechanism may be designed, on account of the distance the sound has to travel, there is necessarily a loss of distinctness. The sound from the several divided portions will not perfectly coalesce—you

appear to get one portion following the other—and the effect is disastrous. At the Crystal Palace, where there is a large organ and a very large orchestra, there is a perceptible interval in appreciating the sound arriving from various divisions of the mass. The organ is always behind the orchestra and choral singing. I do not think the cleverest organist could possibly play in advance. That is one great difficulty. It seems to me the immutable laws of acoustics are somewhat against the divided east and west end organ scheme. I should like to hear the extraordinary American organ we have been told of. I hardly know for what purpose such instruments can be used, except, I was going to say, to tickle the ear. No doubt one could accompany the voices, and performances can be given on it, but it seems to me very far removed from the type of the old church organ, which we have heard exalted as the pattern we should look to with reverence.

Dr. PEARCE.—I should like to say a word about the necessity of large organs in churches. It seems to me, although we may have large organs, yet there is no necessity for having them so very loud, having the wind pressure so very great, so that comparatively a few stops can be employed for accompanying Divine service. Take such an organ as that in Salisbury Cathedral, where there is a very fine Willis organ, divided very much as Mr. Audsley suggests, and where for the service there is a very small cathedral choir. The organist, I know, can only use something like four or five stops; he can scarcely ever use the full swell in accompanying the service. Now, of course, even in old services, we often find places where the "full organ" is marked by the composer, and where a full organ is evidently very effective indeed if it could be used without overpowering the voices; but when we get an organ of such enormous magnitude as that at Salisbury Cathedral, you scarcely ever hear the full organ tone. It seems to me the organ is a great deal too large, and has an unnecessary intensity of tone. I think if we were to go back a little to the old-fashioned church quality of tone like that we meet with in the Temple organ, and a few others of that description, it would be a great deal better.

The CHAIRMAN.—I very much agree with Dr. Pearce in that opinion. I have never been able to see that a large organ must of necessity be a loud organ. I think the charm of a large organ is the great variety that you get in it. That is the great charm of my own organ at the Abbey. I have the greatest possible pleasure in its variety, much more than I have in its grandeur and loudness of tone. I am perfectly sure that is a mistake which is often made, and that that is one of the reasons why a large organ is sometimes

almost considered a nuisance in the church. Organ builders ought to consider that point, as they certainly ought to do if they are going to make a complete instrument. It seems to me a great loss that any instrument of such dimensions as were described to us should be absolutely useless for the ordinary purposes of the service, and a very great mistake certainly has been made in putting it there. But quite apart from its greatness and grandeur, if also you have a variety in a softer quality of tone, then the organ is a joy to those who possess it.

The Rev. J. B. Croft.—We have heard about the organ with repect to two of its qualities, as regards church music, first of all in accompanying the choir, and, secondly, in playing voluntaries; but there is one other, a third part, which comes in—namely, the accompanying of a large congregation. Supposing we have an organ placed as Mr. Audsley suggests, half way between the organist and the altar, and the choir sing a chorale which the congregation know; the congregation take it very readily, and congregations have a habit of being somewhat behind the music. That would be most serious, for although for accompanying purposes the organ has first of all to accompany the choir, it is possible you may have a great body of voices, and how are we going to meet that by one position of the organ? I must say that I have only seen yet one solution of the difficulty, and that is the Continental system of having two positions of the organ, one at the west end and the other in the choir. It is all very well when you have a building like St. Paul's Cathedral or Westminster Abbey, where you have a competent choir and people are content to listen; there the organ will be beautifully placed. But if we want to restore antiphonal singing between the congregation and the choir, it is impossible to do it unless we have either two organs or one organ with the second part played in the west end. I quite agree that, supposing you have a second organ, it should be playable from the same keyboard. I have heard an organ, a long way apart, and it is a regular muddle, whereas if one organ is played distinctly at one time, and the other at the other time, then you get real antiphonal singing. I cannot speak much of cathedral services, but I work in a small poor old church in Westminster where we have introduced the Continental system. We have built a new west gallery and placed the old organ up there, and we have also built a second organ, as good a one as we can afford, to accompany the choir. The west organ accompanies the congregation, and we try to sing on the Continental system. The result with a poor congregation is very satisfactory. At this day if you go to hear the Magnificat in any cathedral abroad you hear one verse sung by the choir, and a second supposed to be sung by

the congregation, but it is in fact played in the alternating form on the west organ. Then the third verse goes on by the choir, and so on. If there are simply only the organ and choir there is no doubt it is possible to do with one organ, but when you have both the choir and congregation joining in, and doing it in an antiphonal sort of manner, then the west end seems to be the position for the second organ. Something was said about the position of the keyboard. There is one part where the choir get away from you altogether, and that is when they turn to the east—they cannot catch your eye then. I must say that the true position of the isolated console which one wants now-a-days is between the choir stalls and the altar.

Mr. Hopper.—Does the same organist play both organs?

The Rev. J. B. Croft.—No, but we hope to have a portion of the west organ connected.

Mr. Hopper.—One man cannot do it.

Mr. Southgate.—The position recommended by the last speaker reminds me of the arrangement at Salzburg Cathedral, where Mozart lived, and, perhaps, played. Here are two organs, an excellent one in the choir and a large one in the western gallery, where is also placed a band. It struck me the effect of first one set of voices singing in the far off choir, and the others responding in the western gallery was exceedingly good.

Mr. Hopper.—Are there two organists there?

Mr. Southgate.—Yes. Might I ask the lecturer to tell us his own opinion, apart from the architectural question, as to the effect of the organ when it happens to stand on a rood screen, or in front of the choir? There are still some examples of that ancient position remaining. In Trinity College, Cambridge, for instance, and at Gloucester and St. George's, Windsor.

Mr. Somers Clarke.—I think we ought to be careful about taking the west end organ, and one in the chancel, such as we find abroad, and thinking we can do the same in an English church. We find there churches 300 feet long, and we have very fine effects, and Mr. Audsley's ideal edifice was a stupendous thing, with a choir of five bays. But I do not know myself a single English Cathedral that has stalls extending to five bays which would be twenty feet each. I do not think the York stalls reach to 100 feet long by a great deal. When you are dealing with these colossal edifices, and have a choir of five bays and all the rest, you need not trouble about the people in the nave, they would be practically out in another place altogether. It is really two places, the nave being one and the choir another, and then you might have another great west organ, or anything you like. That church in Westminster is a comparatively small church. I

am delighted to see the attempt that is being made there, but it is a vile instrument, and I look upon it as a warning, because the west end organ makes a most unpleasant noise which makes every one turn and look up at the gallery, whilst the chancel organ is doing nothing but swell its everlasting in and out until one gets sick of it. I think, therefore, the experiment requires to be watched with very great caution. It is a fatal thing to go abroad and then come home and try to do the same in places only a fraction of the size.

The Chairman.—I do not know what you are going to provide the west end organ for. I mean with regard to congregational singing. All you require, I should imagine, is a large voluntary choir, a good sized organ in the chancel, a judicious organist, and things taken at the proper pace. That is the great difficulty; by taking them at the proper pace a good organist will carry any congregation with him. I did it myself yesterday at the Abbey. We had one of our old-fashioned English tunes, St. Bride's, I think, and we took it to an old-fashioned hymn. We had a very large congregation, the organ is right at the other end of the choir, and the whole congregation are placed to the east of my organ, many of them between the organ and the choir, then comes the choir, and then the huge transepts, which were quite full. The hymn papers were distributed over those transepts, and the congregation sang it, and the effect was splendid. I played it very slowly, and I was spoken to afterwards by someone who noticed the point. There was not the slightest difficulty, because I played it slowly, and I always carefully observe what many organists forget—viz., to keep up the rhythm between the verses, and not to make a long-winded rallentando before starting the next verse. I had not the slightest trouble in pulling that great congregation through that hymn; no west end organ could have done it better, or, I venture to think, as well. What do you want west end organs in churches for? Hymns? I do not think so. For the Psalms? No; the Psalms and hymns can be led by the choir, which no organ could do, I am perfectly sure. I think it is going to a great deal of expense and trouble for very little good. In that church of St. Matthew's at Westminster, I remember the little organ chamber; it is a sort of rat-trap, and the old organ that used to be there really was something like one of those knife-machines.

Mr. Somers Clarke.—It sounds better than it did before.

The Chairman.—I know there is good work done there, and I should be glad to see some result; but I do not think it is fair to judge of what you get out of that rat-trap, and that knife machine, towards keeping a congregation together; but if all be well I will look in one Sunday evening and hear the effect.

Mr. Sergison.—There is one thing that I should like to see come out of this very interesting paper, and that is some sort of practical result. It seems to me that the feeling for organ building is rather on the increase than the decrease, we rather want to have big organs than small ones as a rule. If this paper were sent round to architects, and if architects and organists were brought together, this Association might be the means of bringing about some sort of conference which would be very valuable. The cathedrals are all furnished with big organs. But naturally churches are always being built of a reasonable size, large and small, and I think it is a very difficult question. As one gentleman suggested, orchestral services are becoming more and more common, and there must be room for the orchestra and voices; but the organ is most important, and if the organists and architects could come to some sort of compact that for a certain given number of people there should be certain measurements and certain musical requirements, it would be a very good thing. I speak as a parish church organist. I play at a very large and important church, St. Peter's, Eaton Square, where we have an enormous congregation, some 2,000 or 3,000 people, with an immense organ very badly placed, bottled up in a chamber, with galleries and everything breaking it up. But the architect never seems to have considered that, or the requirements of an orchestra; and when we have a big orchestral service it is the most difficult thing in the world to pack them all in. Still, we manage it somehow, although not so well as if a little method and forethought had been exercised. With regard to congregational singing, I must say that I have never heard grander effects in my life than I have heard produced from congregations of 2,000 to 3,000 people. I find that although the organ is very often at the east end of the church, still if the organist and choir are perfectly *en rapport* and know what they are about, a congregation can be taken fast or slow, and made to sing loud or soft, as you please.

Mr. Webb.—I should like to ask if the lecturer is in favour of raising the organ on the north side of the chancel, say about ten feet above the floor.

Mr. Audsley.—The remarks have been so many that I am afraid I am rather embarrassed. I feel that I have lost somewhat in having to read my paper very rapidly. It is probable that when it is printed you will be able to see that I agree with you more closely than you appear to think. For instance, I most decidedly stated that I preached no crusade against large organs. The only objections are that such instruments are too frequently placed in localities totally incapable of properly accommodating them; and that their builders have so crammed the pipes and everything

together that not a single stop has a chance to speak properly. Under such cramped conditions of space small organs would be infinitely more useful and effective for all purposes. I have examined some hundreds of organs, and it has been lamentable to note the manner the generality of them have had to be packed—so much so, that it was impossible for one half of their tone to reach the ear; in fact, their pipe-work was completely smothered. I have often tested matters by taking out pipes which, in their original position, sounded dull and altogether unsatisfactory, and blowing them with my mouth found them bright and all that could be desired. Under such improved conditions a single pipe gave as much *musical* effect as the whole crowded stop. One thing respecting Mr. Roosevelt and his organs is that he never will over-crowd them, you can pretty well walk between the ranks of their pipes. When I have mentioned this fact to English builders they have replied—we never get a chance of doing work like that. A small organ with five stops only, properly constructed, would give more tone than that of ten or fifteen stops under the present cruel system of packing. That is why I advocate smaller organs; not that I have any objection to large ones. I clearly put it in my paper that while I dispute the necessity of having large organs I preach no crusade against them when and where the architectural conditions are favourable. When the conditions are not favourable, I recommend, instead of seeking to have large organs packed as they are at present, that organists should be content with smaller instruments, properly constructed, and which can be properly heard. With regard to Dr. Bridge's view about variety, I agree with that thoroughly; but you can get more variety by having an organ that you can properly hear the pipes of at their full value, than you can by simply having a large instrument badly placed. I do not quite agree with the doctrine that a portion of a Great Organ—namely, the reeds and mixtures—being in a swell box is fatal to a good effect. In fact, I hold quite the contrary opinion.

The CHAIRMAN.—I only spoke from my own experience.

Mr. AUDSLEY.—In America there are four or five celebrated organists—Mr. Eddy of Chicago, Mr. Woodman of Brooklyn, and others—and they all say, after playing on a Roosevelt organ, that all others seem perfectly insipid. He builds his organs on that principle; there is one at Denver, Colorado, containing sixty-seven speaking stops. There are fifty-five in the manual department, and only four of these stops are out of swell boxes. My answer is very much the same to Mr. Somers Clarke. I do not approve of a large organ placed in a chamber which is totally incapable of letting out the sound; the organ suffers to an enormous

extent. Mr. Southgate said I first condemned large organs and then advocated them. But I did not quite do so. I suggested that it would be worthy of your consideration or discussion whether large organs were always desirable, and then I gave my own opinion later on. For large performances it was said a large organ was necessary, and of course if you have a very important performance it is generally in a very large church, and, therefore, there is not the excuse for having a small organ there—not an excuse for the architect for not providing for the proper reception of a large instrument. Let there be a thoroughly efficient choir or accompanimental organ—I do not mean only four or five stops—close to the choir, and then a grand organ, large enough to rejoice the most ambitious organist's heart at the west end, or any other convenient place, played by electricity from a single console in the choir, not with a view of playing them both together, but one after the other. Of course that does not imply that the west end organ shall not be supplied with an independent set of claviers, so that two organists may take duty when necessary. When you have a large choral festival with oratorios, and you have a grand organ for that purpose, and temporary chorus tiers erected in its vicinity, you would not then use the choir at all for that purpose.

Mr. Somers Clarke.—The people would have to face west, and sit on the backs of the pews.

Mr. Audsley.—Unless it is a chaired church, or specially arranged for the festival, which it should be. With regard to the Roosevelt divided organ, I have given in my paper, advisedly, no decided opinion. I alluded to it with the view of showing what can be done with modern appliances and mechanism. I acknowledge there is a very decided element of trickery about distributed organs. They are, I presume, never played altogether. But anybody who has been to Frieburg and heard the effect of the Vox Humana which is located above the vault of the church, and the general accompaniment from the west end organ, can imagine the sort of effect that is got from distributed organs. The small organ located below in the chapel of the Garden City Cathedral is seldom, if ever, played from the keyboard in the choir. It is used chiefly for morning service in the chapel. The west end organ has rather a good effect occasionally. The upper organs are not much used together. Mr. Roosevelt has modified this extreme arrangement now, and contents himself with a divided choir and a west end organ, played from the one keyboard and also with independent keyboards. I quite agree with Dr. Pearce's opinion, and have tried to impress on all I have come in contact with the necessity of having our organs more softly voiced. Some builders are blowing their instruments up until their pipes

produce tones little short of those yielded by steam whistles, and I think that is fatal to musical effect of any kind, whether in an accompanimental or a solo organ: but one can quite understand it; organ builders have so long had their own way, and have been gradually endeavouring to get more and more out of their instruments, and have found them put in such very bad positions that they have been obliged to voice them louder so as to be heard at all; and then the ear of the organ builder becomes vitiated. I think organ builders are making their pipes speak louder and louder, because they are not getting the tone they feel to want out of them, forgetting that their ears are becoming vitiated. High wind pressure and loud voicing I have been protesting against for a long time. I was asked about the advisability of elevating an organ. Certainly it is advisable, on one condition—namely, that you do not raise it so that one portion of it gets into a warmer stratum of air, and accordingly goes out of tune very quickly. Keep the organ as nearly as possible to the floor in a building likely to be superheated above; but in cathedrals, where you have absolutely nothing of that sort to contend with, the organ should be fairly elevated. In the scheme which I ventured to give in my capacity of a thirteenth century architect, I placed the organ on the level of the triforium on both sides, extending to the roof. Another gentleman spoke about the very expensive and elaborate changes that would be necessary to accommodate my organ. That would not be so in a new building, for very little expense, comparatively speaking, would be incurred in making the modification I suggested, because it is only sweeping away the triforium and clerestory windows, and setting the upper walls back to the walls of the aisles.

Mr. Southgate.—There was one question as to the effect of organs on our rood screens.

Mr. Audsley.—That of course greatly depends on the acoustical character of the building. I have observed the effects very carefully in some old buildings, and have been very much struck with their beauty. In others you find there is a going from you, and a coming towards you, wherever you may be placed. If you are seated in the nave you hear the portion next to you speaking towards you, and then that portion facing the choir seems to be going in another direction. There is a difficulty there, but I may mention one building which has its organ on the screen, and where the effect is very fine under certain conditions. I allude to the chapel of Trinity College, Cambridge. I think I heard there a more impressive musical effect, a few months ago, than I ever before heard in a church in my life. There the organ is elevated on a screen near the west end of the chapel, and the

singers and listeners were all in front of it. There were about 600 men below in the stalls. I was standing on the screen close to Professor Stanford, and I think I was never more impressed in my life than when the whole of the men rose and sang the hymn in unison to a magnificent and florid organ accompaniment. The chapel is a single long parallelogram; there are no aisles, arches, or transepts to break it up.

The CHAIRMAN.—There is a very powerful organ.

Mr. AUDSLEY.—But with 600 male voices singing in unison you could hardly hear that remarkably powerful organ.

The CHAIRMAN.—They would not make much headway against that tuba.

Mr. AUDSLEY.—Professor Stanford did not use it much on that occasion.

The CHAIRMAN.—I am sure our best thanks are due to Mr. Audsley for his admirable paper, and I hope in many respects it may do a great deal of good.

The vote of thanks was carried unanimously; and a similar compliment was paid to the Chairman, on the motion of Mr. Southgate.

MARCH 4, 1889.

W. H. CUMMINGS, ESQ.,

IN THE CHAIR.

THE LATE DR. MONK.

THE CHAIRMAN.—Before beginning the business of the meeting, allow me to say a few words with reference to an event which has occurred since our last meeting; I mean the loss of an old friend and constant attendant here, one who used to be very regular at our meetings—I refer to Dr. Monk, who died last Friday. I am sure it would be quite in consonance with your wishes that I should on your behalf express our sense of the loss we have sustained. Dr. Monk was one of our earliest members and very often took part in the discussions. He was very earnest in his work and very zealous on behalf of the society; not only on that account, but on account of his eminence and high character, I am sure you will agree with me that we ought to send a note of condolence to his relatives.

x Viola da gamba

THE VIOLA DA GAMBA.

BY E. J. PAYNE, M.A.,

BEFORE proceeding with the remarks which I am about to make on the subject of the Viola da Gamba, I ought to say that I propose on the present occasion to treat the subject in its popular rather than its scientific aspect. In doing so, I am possibly taking a course not strictly in accordance with the practice of a society the objects of which I quite understand to be of a scientific rather than a popular character. But I have a reason for doing so, which is, that so little is generally known about the Viola da Gamba, and so completely has this once common instrument passed out of the region of popular use and knowledge, that without some general description, any scientific description and investigation of its nature and properties would be scarcely intelligible. A great deal might be said, and I may perhaps have an opportunity of saying it on some other occasion, on

the Viola da Gamba from a scientific point of view—dealing with the nature and quality of its tone, as contrasted with instruments of the violin type, the scope for execution afforded by its mechanism, and the facilities which it offers to the composer for musical purposes generally, as well as for the production of particular effects. But so unfamiliar has the instrument itself in the course of time become, that I do not propose in the limited time at my disposal to deal with this technical side of the subject, and I shall be satisfied if I am able to convey some broad and general idea of what the Viola da Gamba is, or rather was, and of its use by the great masters, as well as by those who were its special professors, when it was still a practical musical instrument. Now the four odd-looking instruments which you see ranged on chairs before you might serve a moralist as a text for a sermon on the well-worn topic of the mutability or vicissitude of things in general. Two centuries ago the lute and the Viola da Gamba were to musicians very much what the pianoforte is now. If you had told a musician, two centuries ago, that both would shortly disappear from the list of practical instruments, he would have heard such a prediction with an incredulous smile; and even one century ago, if you had said that in the course of a hundred years, even well-informed musical people would not know what the term Viola da Gamba meant, you would have been thought to be indulging in an ingenious paradox. Yet both would have been strictly true. To myself, as it happens, the instrument has always possessed a substantive reality, which is due to the fact that Playford's "Introduction to the Skill of Musick," in which it has a prominent place, was among the favourite books of my childhood; and I can yet recall the disappointment with which I afterwards learnt that it had become practically extinct. To this early familiarity with the Viola da Gamba is perhaps due the surprise I have often experienced at finding musical people totally ignorant of its nature. More than once, when the Viola da Gamba has been mentioned, have I heard the remark that Meyerbeer employs it to accompany a song in the first act of the "Huguenots," thus confusing it with a very different instrument—the Viola d'Amore; and I can assure you as a fact that even among connoisseurs and dealers in stringed instruments it is common to give the name Viola da Gamba, in a sort of dubious sense, to any old nondescript instrument of which the only thing palpably obvious is, that it is neither a fiddle, nor a tenor, nor a violoncello. Quite recently I was visiting a country friend, not without pretensions to a knowledge of musical instruments, who informed me with a mysterious air that he had just acquired a Viola da Gamba of unusual shape. When produced it turned out to be a strange looking instrument, much worm-

eaten, having the scroll, pegs, and neck of a violoncello, but where the body of the instrument should have been it terminated in a mis-shapen block of wood. It was a very old "practice" or dumb violoncello made by Norris, and, as such, not without an interest of its own. My friend, however, insisted that it was a Viola da Gamba, and he further insisted that I should perform a solo on it; and on my avowing my inability to oblige him, I could see that whatever respect he might still entertain for me on other grounds, my reputation as a Viola da Gamba player was gone for ever. I have had brought to me as an undoubted Viola da Gamba an old home-made fiddle, whose only title to this distinction was that the maker, in a moment of inspiration, had seen fit to reject the experience of centuries by fitting up his fiddle with five strings. And a singular misapprehension has prevailed even where one would least have expected it—among persons high in the musical world. I have seen an edition of one of Bach's choral works in which the Viola da Gamba occurs, with a preface by an eminent professor, in which it is gravely stated that the instrument is so utterly forgotten that even if a specimen could be found, nobody could be found to play it. Now, this is so far from the truth, that specimens of all sorts are exceedingly common—I could have got fifty together this afternoon without difficulty. And although the last great professor of the instrument, Karl Friedrich Abel, whose magnificent portrait by Gainsborough has been lent by your chairman for exhibition to-day, died a century ago, I could prove, if it were necessary, that the art of playing it has never died out in this country, but that the traditions of the instrument have survived in a constant succession of amateur performers. The observation above alluded to seems to imply that the Viola da Gamba is a very difficult instrument. Nothing could be farther from the truth. It is really an exceedingly simple instrument, complicated as it may appear; and it is much easier to play than the four-stringed bass, or common violoncello. In this connection I may mention that the fine specimen by Henry Key of Southwark, made in 1611, which you see before you, was brought to me some years since in good playing order, though some time had evidently elapsed since it had been touched with the bow. I have reason to think that it is the identical instrument which was used by Thomas Cheesman, the engraver and miniature painter, and which was given by his representatives in 1842, together with Abel's copy of "De Caix," to Mr. Cawse, the artist, whose performances have often been described to me by one who well remembered them.* I should also mention that my copy of the Paris edition of "De

* **Mr. Henry Musgrave, of Lincoln's Inn and Beech Hill, Bucks, a well-known amateur violoncellist, who recently died at an advanced age.**

Caix," which lies on the table, belonged to Mr. Walter Pettitt, an English violoncellist of high merit, who was also a Viola da Gamba player, and whose rendering on the original instrument of some of Bach's *obbligato* parts is perhaps remembered by some among us. On the Continent the chain of continuity is not so clearly traceable, but I may mention that Friedel, the last of the great German baryton-players (and the baryton, be it remembered, is simply a Viola da Gamba with sympathetic strings), died as recently as 1842; and that there are many Viola da Gamba players on the Continent, among whom may be mentioned M. Tolbecque in Paris, M. Jacob in Brussels, and Herr Paul de Witt in Leipzig.

I now pass on to indicate what the Viola da Gamba is. What is its position in the general musical system? To answer this question I must remind you that since bowed instruments passed out of the embryonic into the organic stage, there have been two, and only two, species of them, the viol and the violin, and that the viol was developed earliest and the violin afterwards. Now the Viola da Gamba is the bass of the viol, as the violoncello is the bass of the violin. What I have called the embryonic stage of bowed instruments lasted until about the end of the fifteenth century. Until that time, although people had been for centuries playing little bowed instruments rested on the shoulder, having the same compass as the treble voice, and variously known as the geige, rebec, crowd, and fiddle, no improvement as regards compass had been effected beyond making an improved and enlarged fiddle to accompany the high male voice — an instrument about the size of a tenor, and having contrary flexures in the sides, like a guitar, to enable the bow to reach the strings of this enlarged instrument. But it never seems to have occurred to them that by reversing the instrument and holding the resonant box or body between the legs, you might get a much larger instrument—one large enough, in fact, to have the same compass as the bass voice. This discovery, which was in fact the invention of the Viola da Gamba, and which was constructively carried out by means of corner-blocks, took place towards the end of the fifteenth century; and thenceforward we find stringed instruments forming a regular group of relative members, each corresponding to one of the species of the human voice, and, like them, available for the performance of music in parts. Besides the treble instrument, answering to the woman's or boy's voice, and the alto instrument, answering to the high male voice, there now came into existence a bass instrument, having the compass of the low male voice. This new instrument, being held between the legs, was called the

Viola da Gamba. It further seems to have occurred to the instrument makers that by making a fiddle large enough to be rested on the ground, and played standing up, like the marine trumpet, you would get an instrument of still deeper tone. In addition to these, therefore, a still larger instrument made its appearance, which was played standing; it had no correlative in the vocal system, but had the same relation to the low male voice which the large double pipes of the organ then in use had to the pipes of diapason pitch. This was the double bass.

This remarkable innovation was the foundation of instrumental part music; and it is interesting to observe that it took place concurrently with the invention of printing, the discovery of America, the Reformation, the rise of the Italian schools of art, and the beginnings of the great fabric of modern physical science. Like all these, it was among the fruits of the great intellectual movement commonly called the Renaissance, and it can, like them, be traced to a simple cause—the vigorous application of common sense to matters which had hitherto been under the rule of routine and tradition.

The size and pitch of the instrument having been thus accounted for, it remains to account for the system of tuning. This was borrowed from the lute, which had at that time been long in use as a bass instrument.

The little treble instruments of the Middle Ages, of which I have spoken, were tuned by fifths. For instruments having short strings this is the natural tuning, because each finger of the left hand easily commands a tone, or a semitone, at pleasure, without shifting; but when you come to a bass instrument like the lute, the case is altered. The strings are double the length, and therefore the intervals to be stopped are doubled also. The fingers will only command a semitone, so that if you are to pass from one string to the next without shifting you cannot well have a greater interval between them than a fourth. In order to get the same compass as the voice, that is, two octaves and rather more, you therefore require five or six strings instead of three or four, and in order to keep six strings in the same relative tonality one of the middle intervals must be greater or less than a fourth. Sometimes a fifth was used, but the usual exceptional interval was a third. In this way there had already been invented for the bass lute that peculiar system of tuning by fourths and a third, which was now applied to the Viola da Gamba. It still survives in the guitar, and is by far the simplest and most convenient mode of tuning any bass stringed instrument. Applied to an instrument with six strings, it makes the highest string just two octaves above the lowest. So that, allowing the

moderate compass of an octave for your performances by the aid of the shift on the highest string, it gives you a compass of three octaves. Allowing one and a half octaves on the highest string, it gives you a compass of three and a half octaves, being about the same compass as the contemporary keyed instruments, the organ and clavichord.

Such was the origin of the Viola da Gamba. The word "Gamba," meaning the leg, with especial reference to the knee joint, is Low-Latin as well as Italian; the old French form is "Gambe," now softened to "Jambe." Hence we have Italian, "Viola da Gamba"; Low-Latin, "Viola de Gambâ," also in the plural, which is strictly correct, "De Gambis," which survives in the familiar passage of Shakespeare, in which Sir Andrew Aguecheek is described as a virtuoso on the "Viol de Gamboys." Hence also the old French name, "Viole de Gambe." In Germany a feeble attempt was made to introduce the native equivalents "Knie-geige" and "Bein-geige," but it came to nothing, and the French or Italian name was always used. "Gambe" occurs in old German MS. music, and "Gamben-spieler" for a player. In France and England it soon came to be regarded as the viol *par excellence;* and, as a rule, whenever "viol" or "viole" is mentioned in old English or French music, and where a "violist" is mentioned, the bass and its player are intended. In England it came extensively into use in the time of Elizabeth. It was made in three sizes, the largest called the "consort-bass," the use of which is explained by its name, of which my instrument, by Key, is an example; the second, or ordinary size, was called the "division viol," because chiefly used in the performance of divisions or variations on a ground bass; the third and smallest size was called the "lyra viol," and was used in playing from tablature, by those who had not mastered the staff-notation. Playford, no doubt following the vernacular pronunciation, gives them all the general name of "Viol de Gambo," of which the term "grumbo," still familiarly applied to the violoncello, is a corruption. The use of the name in England in its accurate form, "Viola da Gamba," dates from the arrival here of Handel and other German musicians in the Georgian period. In France, though "de Gambe" occasionally occurs, it is generally called simply "la viole." It is curious that in Italy the original name, which survived elsewhere, was soon abandoned. The usual name at a later stage is "violone" or "big viol." The accompaniments to Corelli's solos for the violin, for instance, which are clearly written for the Viola da Gamba, are marked "violone." At a still later stage, apparently to distinguish it from the double bass, it seems to have been called the "violoncello" or "little violone."

Marcello's Viola da Gamba Sonatas, perhaps the most popular of all works for the instrument are in the oldest edition I have been able to consult marked "violoncello." When the bass violin drove the Viola da Gamba from the field, the name violoncello was apparently appropriated by the superior instrument.

This brings me to the story of the abandonment of the viol in favour of the violin. The circumstances in which the tuning by fourths and a third and the peculiar mode or construction associated with it came to be abandoned are as follows: About the middle of the sixteenth century some anonymous mechanic discovered that if you abandoned the flat back hitherto in use, and gave the instrument what is called a "model" back, corresponding to the belly, you greatly increase the reverberation of the air which it contains, and it must also have been observed that if you reduce the number of strings there is a still further increase of power, because there is less resistance to the bow. Now, if you have four strings instead of six, and tune those four strings by fifths, you get a compass nearly equal to that of your original instrument tuned by fourths and a third. The application of these simple principles resulted in the construction of the violin.

The first violins made were alto, or, as they are now usually called, "tenor" violins. Soon afterwards the violin model was applied to the treble instrument. Treble violins appear to have first come into use in France, and in an early Italian score are called "Piccoli Violini alla Francese." About the same time the first bass violins, now known as "violoncellos," were made. Now the violin, using the term generically, is a decidedly louder instrument than the viol. The whole history of stringed and other musical instruments, exactly like that of living species, is the history of a struggle between new forms and old ones—a struggle which invariably ends with the final victory and survival of the loudest. Accordingly, the violin gradually drove the viol from the field. The first to disappear in practice (though it long survived as a fancy instrument) was the treble viol. It could not hold its ground for a moment against the violin, which has twice its tone. You may get a good imitation of the treble viol from a violin with the mute on. Then the tenor viol went; and, last of all, at some distance of time, and under peculiar circumstances, the bass viol went also.

But here the process stopped, for the double-bass viol has not gone. In the common orchestral double-bass of to-day we still behold the viol pure and simple, and listen to that dry, solid, penetrating tone, which is peculiar to the viol model. The double-bass violin has been often tried, and a sort of compromise between the two models for the double-

bass produces a passable instrument. It is, nevertheless, found that for penetration and quickness of speech, combined with a moderate volume of sound, which are the qualities required in the lowest register, you cannot beat the pure viol. In addition to this, it is cheaper to make. The costliest part of the fiddle is always the back; and, setting aside the extra cost of the material, the labour which a model double-bass back absorbs is enormous. A viol back, as you see at once, is a simple piece of joinery, such as any cabinet-maker could make in a few hours. For these reasons the violin double-bass has never superseded that of the viol pattern.

Considerations of the same kind no doubt assisted to postpone the extinction of the Viola da Gamba. As a solo instrument, not only is there much more to be done with it than the violoncello, but its tone, though less in volume, is undoubtedly more penetrating, more flexible, and more easily yielded. But what kept it long in use after the invention of the violoncello was the difficulties which beset the management of the latter instrument, especially in adapting it to the more complex music which came into use in the seventeenth century. But for this we cannot doubt that the violoncello would have superseded it earlier. The more powerful instrument was early used to support bass voices in the church, and from this the transition was easy to the theatre. In the operas of Lully, some of which I have had the opportunity of looking over this morning, we have an intermediate stage. The continuous bass is assigned to the viols, while an occasional part marked "Basse de Violon," appears for the violoncello. In the early part of the eighteenth century we know as a fact that the bass players were required to play their part on the violoncello. But the violoncello, being simply a bass violin, and therefore an instrument tuned by fifths, is a difficult, and one might almost say—using the term in the mathematical sense—an *irrational* instrument. A bass instrument tuned by fifths is out of proportion to the human hand. The hand cannot command more than two tones, whereas in scales which do not admit of the open string it is necessary that three should be commanded. In general playing, therefore, perpetual shifting is necessary, and it was not until the middle of the century that the inherent difficulties thus presented were overcome. The turning point is marked by the publication of Duport's "Essai sur le Doigter du Violoncelle," though it appears that players in Germany and other countries had for some time been working on the same lines. When the simplified fingering of the violoncello had been thus popularised, the extinction of the Viola da Gamba was only a matter of time. Disused in the orchestra, solo players became fewer and

fewer, and the last of them, the famous Abel, who came to England in 1758, died in 1787. A composition by this celebrated player, written for and dedicated to his pupil, Elizabeth, Countess of Pembroke,* is the first piece in the programme. I should observe that the Viola da Gamba was a favourite instrument with ladies in the last century; this is illustrated by the prints and pictures on the screen, especially the interesting portrait by Zoffany, which has been kindly lent by Messrs. Hill & Sons. It is really a much more suitable instrument for ladies than the violoncello, and it is possible that in the course of time it will be revived for their use. (Illustration 1. Sonata for Viola da Gamba, *senza basso*, Abel. 1, Adagio; 2, Menuetto and Trio; 3, Allegro.)

In proceeding to say something about the employment of the Viola da Gamba by the great masters, which is one of the most interesting aspects of the subject, I should remark that on a review of what has been said it will appear that the Viola da Gamba remained in use, though its position was being slowly undermined by the advance of the violoncello, during the period which is covered by the musical activity of the great masters anterior to Mozart and Beethoven. And it was evidently a favourite instrument, not only with those who played it, but with all the great composers of this period. In France it was written for, as a chamber instrument, by Rameau, Couperin, and Marchand; in Germany, by Bach, Immanuel Bach, Handel, and Haydn, though in Haydn's time, as I shall shortly show, it assumed a slightly different form—that of the baryton. And, passing over the Beethoven period, it is curious to find that one of the most beautiful and effective compositions of Schubert is the Sonata for Pianoforte and Arpeggione, a six-stringed bass, tuned by fourths and a third, put forth by a Viennese fiddle maker in the present century as a new invention, but which was simply the Viola da Gamba very slightly disguised. That this instrument should have attracted Schubert's attention is, to my mind, no unimportant testimony to the musical worth of the Viola da Gamba. Time does not permit me to introduce illustrations from more than two or three of the great masters, and I must begin with Bach, the greatest. I should have been glad to introduce to you one of his three great Sonatas for the harpsichord and Viola da Gamba, but my plea in excuse must be that they are long, that they are generally found somewhat dry, and that I cannot pretend to play them as they should be played. I will, therefore, by way of making what I am sure you will find an agreeable change in the entertainment, call on the lady vocalist who has kindly consented to assist me, to sing Bach's well-known aria,

* From a copy in the composer's autograph in the British Museum.

"Mein gläubiges Herze." I ought to mention that this spirited composition was originally so far devoid of religious influence or significance that it formed part of an after-dinner entertainment provided for a German Prince on a hunting expedition, the original words being something equivalent to our popular ditty, "We'll all go a-hunting to-day." The accompaniment, originally written for the Viola da Gamba, was afterwards assigned by the author to the piccolo violoncello. (Illustration 2.)

I shall postpone until the close of my remarks what I have to say on the use of the Viola da Gamba by Handel, and the specimen of Haydn will require some explanation of the peculiar form of the instrument for which it was written. Before I come to this I must say something about the technical writers, whose function it was to prepare the way for more gifted composers—a class of musicians who are sometimes unfairly undervalued. It is interesting to observe that England was undoubtedly the country where the Viola da Gamba was first thoroughly studied, and its capacities were earliest displayed. And as the technical development of the Viola da Gamba preceded that of all other stringed instruments, it may be truly said that the mechanism of bowed instruments was first elaborated in this country. The first method, worthy the name, for any bowed instrument, is Christopher Simpson's "Chelys Minuritionum Artificio Exornatâ," a copy of the second edition of which, published in 1667, is on the table for inspection. It is a complete method for the Viola da Gamba, and so intimately is the mechanism of the instrument blended with the fundamental laws of music, that whoever masters it will be a well-grounded musician as well as a player. I could long linger over the many points of interest presented by this work, and over the characteristics of the numerous English writers of Simpson's school, whose multitudinous works exist in MS. in public and private libraries. One of them I ought to mention—Daniel Norcombe. I am not aware that any of his compositions were printed, but they must have had an extensive circulation in MS. copy; and if any student wishes to be directed to a pure fountain of serious instrumental music, I can recommend Norcombe. Passing over the English school of violists, I come to a school of wider celebrity—that of France. Here, among many other names, the most famous are those of Marin Marais and Louis de Caix d'Hervelois. A copy of the "Suites" of the latter, which once belonged to Abel, and has many of his notes and fingerings, and which afterwards passed through the hands of the amateur violists Cheesman and Cawse, lies on the table. De Caix and Marais were both writers of great interest. Marais, whose master was Ste. Colombe, was the more famous player. He brought

into use, for a time, a seventh string, tuned to the A on the third ledger-line below the bass stave; and this additional string is occasionally required in the Bach Sonatas. Abel, however, abandoned it, and used the six-stringed instrument.* The seven-stringed Viola da Gamba of Marais was in fact only a revival, as may be seen by the engraving of Domenichino's St. Cecilia, which hangs on the screen. Marais was also a composer of operas, both alone and jointly with the younger Lully, in which some surprising orchestral effects are found. But as I have only time to illustrate one of them, I choose De Caix, because he affords an opportunity for hearing two viols in concert. I will, therefore, with the assistance of my friend Mr. Currey, introduce three movements from his Suites for two viols. They are in dance form, and each has a fanciful title indicative of the character of the piece. (Illustration 3. L'Angélique, La Follette, La Villageoise.)

I cannot pretend that these compositions have any great musical value or importance. They are given for what they are worth, and they will, at all events, serve as a contrast to the slow movement which stands next on the programme—one of Haydn's very numerous works for the baryton, probably composed for Prince Esterhazy, who was a devotee of that instrument. The baryton, it should be explained, is simply a Viola da Gamba having sympathetic strings, like the viola d'amore. Haydn's own baryton is preserved in the museum of the "Gesellschaft der Musik-Freunde" at Vienna. It is an old German bass of the Stainer period, and its sympathetic apparatus is very primitive, consisting merely of ten metal strings passing over wooden blocks glued to the belly. The interesting specimen by Johann Ulrich Fischer, of Landshut, which I exhibit to-day, is really a baryton of the same rudimentary type. When I bought it it had sympathetic strings, and you can see the very simple apparatus by which they are worked. I have, however, been obliged to dispense with them, partly because they make a great noise, and produce an effect to my ear not very musical, but chiefly because of the trouble of keeping them in playing order. Life, it seems to me, is not long enough for instruments with sympathetic strings. The German noblemen, who played the fully developed baryton, which had twenty-four of them, probably assigned the duty of keeping them in order to attendants specially trained for the purpose. I do not think the composition which is now introduced will lose much by their omission. (Illustration 4. Andante by Haydn.†)

* Abel's instrument, as represented in the Gainsborough portrait, appears to have been a large German one, having a "rose" under the fingerboard.

† Edited for violoncello and piano by Burchard. (Berlin: Simrock.)

The two compositions by Handel, which conclude the programme, illustrate the great master's use of the instrument in two widely different fields—the theatre and the chamber. More than once Handel recurred to orchestral effects which had been familiar to him in youth. A well-known instance is "Revenge, Timotheus cries," in which he introduces into the orchestra the great tenor or taille, as well as the small tenor, or rather alto (haute-contre), thus reproducing the five-part theatre-orchestra of Lully and his contemporaries. Another instance, to which I now call attention, is of greater interest. In the opera of "Giulio Cesare" there is a remarkable scene which represents a sort of Palace of Delight, called "Mount Parnassus," and an orchestra, consisting among other instruments of harps, theorboes, and Violas da Gamba, is seen on the stage. After some symphonic strains the figure of *Cleopatra* is revealed to the eyes of *Cæsar*, and she then proceeds to sing the air "V' adoro, pupille," which has a double orchestral accompaniment, that of the stage orchestra predominating. The viols play in unison what is really a distinct *obbligato* part, which in the trio, "Pietoso vi brama," becomes more impassioned. This fine song, originally sung by Cuzzoni, has probably never been performed with the Viola da Gamba since her time. The rendering of the accompaniment which is now offered to you is, of course, but a poor representation of the original; but it may suffice to convey some idea of Handel's use of the instrument in the orchestra. (Illustration 5. "V' adoro, pupille."*)

The last composition on the programme illustrates the same composer's use of the instrument in concerted chamber music. It is interesting to observe that the Viola da Gamba appears in association with the harpsichord in the earliest specimens of that species of chamber music in which a clavier instrument takes the principal place, in concert with one or more bowed instruments. It would be interesting to enquire by whom this combination was first arranged. Marchand, the famous Parisian organist (1669-1732), in one of his works, in which there appears amongst other things a composition for the harpsichord with an alternative *obbligato* part for Viola da Gamba or violoncello, claims the credit of it; and Rameau's trios for the harpsichord, violin, and Viola da Gamba were, I believe, the earliest "pianoforte trios." The work of Handel, from which the two opening movements are now given, is, so far as I know, the only work of the author in which the harpsichord appears as the principal instrument in concert with another. Occasionally there occur in Handel's works passages, numbers, and even

* Printed with pianoforte accompaniment in "Handel's Opera Songs," by W. T. Best. (Boosey & Co.)

whole compositions as to which it is difficult to resist the conviction that they must have been composed to, or with the aid of, the Viola da Gamba. The Dead March in "Saul" is an instance; with the lowest string tuned to C (following the direction of Simpson for the key of that signature), it is easily played on the instrument in its full harmony throughout. The Sonata from which the following movements are extracted* leaves no doubt in my mind that the composer was himself a player on the instrument. (Illustration 6.)

[The attention of the audience was then briefly directed to the instruments, and to the pictures, prints, and books exhibited.]

The following programme of music was performed:—

PROGRAMME.

1. SONATA for Viola da Gamba, *senza basso*, dedicated to the Countess of Pembroke ... ... *Abel*
(Adagio, Menuetto and Trio, Allegro.)
MR. PAYNE.
2. ARIA, "Mein gläubiges Herze" ... ... *Bach*
MISS B. C. BEEVOR.
(Viola da Gamba *obbligato*, MR. PAYNE.)
3. Movements from Suites for two Violas da Gamba *De Caix*
(*a.* "L'Angelique," *b.* "La Follette," *c.* "La Villageoise.")
MR. PAYNE AND MR. CURREY.
4. ANDANTE for Baryton or Viola da Gamba ...*Haydn*
MR. PAYNE.
5. ARIA. "V' adoro, pupille." ("Giulio Cesare") *Handel*
MISS B. C. BEEVOR.
(Viola da Gamba *obbligato*, MR. PAYNE.)
6. ANDANTE and ALLEGRO from Sonata for Harpsichord and Viola da Gamba ... *Handel*
MISS BEEVOR AND MR. PAYNE.

SPECIMENS EXHIBITED.

1. VIOLA DA GAMBA, by HENRY KAY or KEY, of Southwark, 1611. (MR. PAYNE.)
2. " " " JACOB STAINER, of Absam, 1667. (MR. CURREY.)
3. " " " JOHANN ULRICH FISCHER, 1720. (MR. PAYNE.)
4. " " " JOHANNES FLORENUS GUIDANTUS, of Bologna, 1728. (MR. PAYNE.)

MR. WILLIAM H. CUMMINGS also kindly lent a Portrait of KARL FRIEDRICH ABEL (1725-87), by T. GAINSBOROUGH.

* Edited for pianoforte and violoncello, by F. Grützmacher. (Leipzig: Senff.)

DISCUSSION.

The Chairman—I have now the pleasing duty of proposing a vote of thanks to Mr. Payne for the very interesting lecture he has given, and also for the illustrations he has afforded us an opportunity of hearing. Probably many of those in the room have never heard the Viola da Gamba before. I do not know whether you desire to hear it again, but that is for you to decide hereafter. There have been times when great fights have taken place over the merits of the instrument. Mr. Payne has given a very long *résumé* of the history of the instrument. Two hundred years ago it was really one of the most favourite instruments then in use. Both princes and people were agreed in their love for it, and in the time of Charles II. one of the greatest Viola da Gamba players was a minor canon of Canterbury Cathedral, who was not only that, but also an excellent musician, for in addition to being minor canon he was one of the gentlemen of the Chapel Royal, and was noted for his very fine bass voice. In fact, he was the man for whom Purcell composed that celebrated solo "They that go down to the sea in ships," where, instead of going down to CC, he goes down to DD. He was very celebrated then for his performance on the Viola da Gamba. At that time the Viola da Gamba in use was the kind with the sympathetic strings, so-called, and those sympathetic strings must have produced something of the effect which we hear when some-one sits down to the pianoforte and proceeds immediately to put his foot on the right pedal and then pound away; but the disagreeable effect of sympathetic strings in the case of the Viola da Gamba was very much increased, because, as Mr. Payne told you, there were often twenty-four of them. I imagine in Purcell's time there were not quite so many, probably only six, or not more than nine. However, those must have been extremely disagreeable, for it is on record that Purcell so hated Gosling's Viola da Gamba that he wrote a catch, of which I am sorry I cannot remember the words, but it had something to do with "zingle, zingle, twang, twang, twang, zounds, zounds, zounds." The catch and the music is rather interesting. Gosling, no doubt, was a most excellent performer; he was a capital musician, and possessed a very fine library of music, many of the volumes of which are to be found in the libraries of Sir Frederick Gore Ouseley and others. Not only was he a great singer, but he was one of those men who were fortunate enough to get rewarded by Charles II. I do not know that it happened more than once, but there is a case on record. Charles II. on one occasion said he was a *gosling* which produced such golden

notes that he ought to have golden eggs, and thereupon he gave him a box of sovereigns, but I am not aware that Charles ever repeated this pleasant practical joke. Mr. Payne has referred to Abel, the great Viola da Gambist. His portrait is here for us to-day, owing to the fact that Gainsborough was not only a painter, but also a musician—that is to say, he had a feeling for the beautiful in music as well as in painting, and he was of that curious nature that the last instrument he heard always seemed to have carried off his love. When he heard Fischer play the oboe he at once bought the instrument and took lessons. I suppose he did not get on very well with that, and then this man Abel visited Bath, where Gainsborough was then living, who when he heard him play on the Viola da Gamba made up his mind that that was the most glorious instrument ever invented, and he bought the Viola da Gamba which Abel then used, and studied the art of playing it. He persevered for a time, gave it up, and took to it again. It was in consequence of this great love for the Viola da Gamba, which he maintained to the close of his life, that he painted the portrait of Abel twice. One picture he disposed of—gave it to Abel himself—and the other he would not allow to be sold, but bequeathed it to his daughter, and that is the one we have here. Abel was not only a player of the Viola da Gamba, but was a thorough musician. He was a pupil of John Sebastian Bach, so that we can probably imagine the reason why Bach wrote so many things for the Viola da Gamba. Abel not only played on this instrument, but when he first came to England he performed on a novel instrument which is now unknown. It is also recorded of him that he was able to play on every instrument in the orchestra, and we have records of him playing horn solos. He wrote an immense amount of music, some of it very good no doubt. His pupil, J. B. Cramer, also an excellent musician, in a little work I have here entitled "Abel's Adagios," speaking of himself, says he owes all his excellence to Abel, the master from whom he learnt, and prints three or four of his Adagios to show what Abel could do as a composer. Abel was a very voluminous writer. Dr. Burney speaks of him and his works as being most excellent. I have never seen a complete list of what he wrote, but I myself have some twenty sets of symphonies, overtures, and so on. I have also one small manuscript in his autograph. I was very much struck just now with that Bach song, which I did not remember had been written for a hunting song—the one we know as "My heart ever faithful." It was interesting to hear that it was a hunting song, and probably that would account for the fact that the leading note at the end suddenly tumbles down to the seventh below,

instead of rising to the right note. Perhaps it is typical of having lost the game they had been in search of. We shall be glad now to hear any remarks about the various topics that have been enlarged upon by Mr. Payne. One thing I would like to mention: he thinks that that is the only instance of Handel writing a Concertante for the harpsichord and some other instrument. I think I have several things for the harpsichord and violin, harpsichord and flute, and so on.

Mr. PAYNE.—The Chairman probably alludes to Handel's "Twelve Solos," which are accompanied "Solos" for various instruments, with the harpsichord part not written out, but only appearing as a figured bass. The sonata in question is rather a harpsichord sonata, with an *obbligato* part for the Viola da Gamba. I may be wrong, but I think it is the only work of that description of Handel which is known.

Miss PRESCOTT.—Could Mr. Payne describe at all the way in which the sympathetic strings were constructed?

Mr. PAYNE.—The sympathetic strings were merely fine brass or steel wires, tuned to the diatonic or chromatic scale. The mode of attaching them will be easily understood if you look at the instruments. In addition to Mr. Cummings's interesting autograph, I have here a number of works in Abel's writing. I have also a great curiosity in the shape of De Caix's works, with Abel's alterations and fingering. There are two volumes—one was bought in London, and the other seems to have been in Germany for nearly a century. There are also various other books.

Mr. SOUTHGATE.—I am sure we shall all willingly support the vote of thanks to Mr. Payne for the very delightful performance he has given us, and also for the information he has afforded. In speaking of the Viola da Gamba players of foreign countries he modestly left out those of England; but it is quite certain from what we have now heard that we possess one Viola da Gambist, of whom we have reason to be proud. I would ask Mr. Payne, in speaking of the theorbo, whether that was tuned to the same pitch as the Viola da Gamba?

Mr. PAYNE.—The instrument has substantially the same pitch. The lute at different periods varied very much in the tuning, but it orginally had six strings tuned by fourths and a third. It was played from tablature, so that it made no difference to the player what the tuning was. The theorbo had a certain number of bass strings which were not stopped. The tuning of the other strings was orginally the same with that of the Viola da Gamba. There is a great deal of music written for the Viola da Gamba, or lute, as may be preferred; for example, in Bach's own scores, especially in the St. Matthew Passion, the Viola da Gamba *obbligato* part is marked alternatively "Viola da Gamba or lute."

Mr. Southgate.—Did the lute go as low as the Viola da Gamba?

Mr. Payne.—A little lower.

Mr. Southgate.—That might account for both instruments being so popular, as the music could be played by either. I would ask if the time at which the Aria of Bach was played is indicated by the composer? To our ears it sounded very fast indeed, but when Mr. Payne mentioned that it was composed originally as a hunting song that might give some idea as to the time.

Mr. Payne.—I cannot remember what indication of the tempo is given in the original cantata. It is a song that if taken slowly, as it often is, is apt to produce rather a dismal effect; and it has often occurred to me that the original words would be more appropriate, the song being then, of course, taken at the corresponding time. I have no recollection of the tempo marked.

Mr. Southgate.—In the case of using the Viola da Gamba as a concertante instrument, we can hardly judge of the balance of effect which the composer intended, because, of course, the pianoforte differs very widely from the harpsichord. No doubt if the composition were played on a spinet or harpsichord we should get more nearly the effect the composer intended.

The Chairman.—Bach himself often took secular songs and used them to sacred words, so that it must not be supposed that we are doing something very dreadful, or violating the composer's canons of taste in doing that. He was not at all particular about what he used of his own compositions.

There is one duty we must not omit, and that is to thank the ladies and the gentleman who have assisted Mr. Payne on this occasion with the illustrations. The lecture, of course, has been made much more interesting by these illustrations; naturally you cannot hear trios without having three people, and having three performers necessitates a considerable amount of practice beforehand, so that we are very much indebted to these ladies and the gentleman for kindly assisting on this occasion.

April, 1889.

T. L. SOUTHGATE, Esq.

In the Chair.

THE LAWS OF PROGRESS IN MUSIC.

By Edgar F. Jacques.

When, a year ago, I accepted the flattering invitation of your assistant secretary to read a paper before you, I did not, I am afraid, sufficiently realize the difficulties of the undertaking. Casting about for a subject, it gradually dawned upon me that any attempt on my part to convey original information would be futile; for, not having a claim to be considered a specialist in any one branch of the musical art, my efforts could only have resulted in the process familiarly known as "carrying coals to Newcastle." As such a waste of time was not to be thought of, it finally struck me that if I could not *impart* information, I might at least be the means of eliciting it, by supplying materials for a profitable discussion, which in its turn might stimulate to further enquiry and investigation. This I resolved to do, and as a natural consequence directed myself to the discovery of some neglected or hitherto imperfectly treated subject. I submit that Musical Progress is such a subject, and that its neglect, however easily it might have been accounted for fifty years ago, by the difficulties which would then have stood in the way, is no longer justifiable at the present day.

It will however be obvious to you that in the short time at our disposal we can do little more than arrive at some estimate of the problems to be solved, and, perhaps, sketch roughly the methods most likely to lead to their solution.

At the outset, therefore, it will be well to define as clearly as possible the exact meaning of the words "Law," "Progress," and "Music"; for although most fairly well-educated persons feel perfectly certain that they know what is meant by these terms, it will be found on close investigation that writers and speakers alike are prone to use them without attaching any very exact limits to their signification. Being anxious

that *my* meaning at least (such as it is) shall not be misunderstood, I will, with your permission, define the sense in which I use the words "Music," "Progress," and "Law."

The scientific use of the term "Law," as, for instance, when we speak of "the laws of nature," marks of course a distinctly higher conception of the cosmos than that which regarded events as more or less the result of capricious though benevolent Omnipotence. Nevertheless it is misleading, and for this reason: "Law"—etymologically "something laid down"—may be classified as divine, human, and scientific. Divine law implies a command emanating from the source of all things and the breach of which is visited by *spiritual* "sanction"—that is to say, punishment. Human law implies a command emanating from the sovereign power and enforced by *material* sanction or penalty. But, in a scientific sense, a "Law" is no more than a register of its promulgator's experience expressed in a general term. And sometimes his "law" is shown later to have been no law at all, but only a guess, based on an insufficient number of observations; upon faulty reasoning—or upon both.

In the introduction to his "Animals and Plants under Domestication," Mr. Darwin says: "I have often personified the word 'Nature'; for I have found it difficult to avoid this ambiguity; but I mean by 'Nature' only the aggregate action and products of many natural laws, and by 'Law' only the ascertained sequence of events."

And Professor Huxley puts the matter this way: "When we have discovered by attentive and repeated observation that certain events always happen in the same order, or that anything is invariably the cause of a certain effect, we call the truth so discovered a *law of nature*. But it is desirable to remember (what is often forgotten) that these laws of nature are not the causes of the order of nature, but simply our fashion of expressing what we have been able to learn with regard to that order. Human laws consist of commands addressed to voluntary agents, who may obey or disobey; and infractions of the law do not annul it or deprive it of its effect. Natural laws, on the other hand, are not commands, but merely assertions concerning the invariable order of nature, and they preserve their character as laws only so long as they are found to describe that order. To talk of the violation or suspension of a law of nature is an absurdity. The utmost this can mean is that in certain circumstances the assertion contained in the "Law" is inexact; and the conclusion to be drawn is then not that the order of nature has been interrupted, but that we have made a mistake in our formulation."

Now although most of you are probably quite familiar with the distinction I have pointed out, it was not perhaps

altogether superfluous to accentuate it, if only for the purpose of making perfectly clear my use of the word. So much, then, for the word "Law."

With regard to the term "Progress," ambiguity is much more noticeable. The word of course is generally used as indicating improvement—that is to say, a movement in the direction desired by the speaker. We have therefore as many different notions of what constitutes "Progress" as there are opinions on what is desirable. Thus, though men differ but little in the *subjective* meaning they attach to the word, a common standard of that which constitutes its *objective* characteristics is by no means agreed upon. Yet it is not for want of a clear definition: that was given about thirty years ago by Mr. Herbert Spencer in an article, "Progress: Its Law and Cause," which appeared in the *Westminster Review*, and which is now incorporated in that wonderful book of his, "First Principles," which, when we contemplate its far-reaching results, may, I think, be characterised as one of the most important scientific works of the nineteenth century. We shall have occasion to refer to it later on when we come to deal with the principles which underlie the subject of my paper.

Music.—In attempting to trace the evolution of a work of nature, we can do no more than note the successive aspects it has presented at different stages of its development; formulating, as well as may be, the more constantly recurring phenomena in terms sufficiently general to be regarded as a *law*. With respect to the products of human activity we are not so restricted. All our investigations of the works of nature result in no more than an answer to the question, "How"? The "Why" escapes us. Not so with the works of man. The products of his activity are, to use again the words of Mr. Herbert Spencer, "an objective register of subjective facts." And if this be so with man's works generally, how much more so must it be with regard to music—the most immaterial of all the arts! Yet, in the majority of our text-books, the *objective* side of music is almost exclusively dwelt upon, and we are obliged to refer to works on æsthetics for any explanation of the "subjective facts" which that which we call "music" depicts, though it is satisfactory to find that, of late, some at least of the psychological or subjective aspects of the art have received attention from eminent writers outside the domain of æsthetics. You would, very rightly, resent any definition, on my part, of music regarded from an objective point of view; but it is absolutely necessary, if I am not to be misunderstood later on, that I should clearly define what I regard to be the nature of the originating impulses which lead to the production of a musical work, since upon this point much

diversity of opinion exists. And at the outset I would submit that a distinction ought to be drawn between the producer of music—the composer—and the consumer of music—the listener. The difference I speak of is, it is true, one of degree rather than kind; but, at the present stage of our musical progress, it is so great that it separates the two classes most distinctly.

The productive artist, then (whether he be poet, painter, sculptor, musician, dramatist, or novelist), is one whose primary qualification for the title is the desire to express in a permanent form the moods, thoughts, and feelings which constitute the impressionable material of his inner life. Being, in the first place, more responsive to impressions than other folk, his mind becomes rapidly stored with vivid reminiscences of life's experience; and when the impulse to create is upon him, his heightened feeling selects from this store, with more or less success, the requisite fragments, and welding them together produces that which we call a work of art. It is important to notice that in this process that which was received in the form of an image or a thought may be given out in the form of a feeling, a mood, or an expression of character, and *vice versâ*. In other words, that which was first gained through the eye may be translated into an appeal to the ear; or that gained by the ear translated into an appeal to the eye. Thus a painter may be inspired by a poem or a piece of music, a musician by a picture or a landscape. Now, according to my view, it is this *impulse to express* which constitutes the artistic faculty *par excellence*. The gift which *enables* the artist to express is another affair. This, I take it, consists largely in the faculty of imitation, in the gift for form, and in the special sense pleasure which attracts the formal gift in one direction rather than another. It is obvious that a great delight in sound being indicative of a high degree of nervous sensibility in the organ of hearing, emotional activity will seek an outlet in the satisfaction of that sense rather than in that of another, and will be greatly assisted in so doing by the much larger amount of raw material of the necessary kind already accumulated in the mind. For, the impressions received through the sense which is most developed will naturally be more vivid—will be more easy to recall, and will exist in greater number than those which we have obtained through less impressionable channels.

But how come these forms so to connect themselves with the emotional impulse as to represent it intelligibly? Indeed, are we not assuming too much, some will ask, in asserting that they do so? In answering these questions we must carefully bear in mind certain facts which it is one of the objects of this paper to indicate—firstly, that whatever music may lay claim to be able *now* to achieve, it has not always

been able to do, otherwise there would be no meaning in the term "progress"; secondly, that in affirming the intelligibility of music as an emotional language, we must not omit to consider the capacity for comprehension possessed by listeners. It is clear that we cannot expect a language to be understood by those who have made no study of its idiom. But, we are told, music is a "universal language." There is no greater mistake. The forms assumed by this language, that is to say, the tunes, are indeed universally understood *as tunes* (when of a direct and fairly symmetrical character), but as representations of the emotional states which prompted their creation, we may assert, I think, without much fear of being accused of hasty generalisation, that they are but very imperfectly comprehended by the vast majority of those who constitute the consumers of music—the public. The reason is not far to seek. Those in whom the musical faculty is strongly developed, and who are also *artistic* in the sense in which I have defined my use of the word, are keenly alive to the sounds of animate and inanimate nature. The rhythms and tones continually heard become closely associated with innumerable scenes and events, and the emotional states to which these have given rise, and a crowd of subtle associations is consequently formed which by practice becomes a language. We have some curious testimony on this point from Richard Wagner. In "A Communication to his Friends,"* he says: "I had previously had to gain the capability of musical expression, in the same way that we learn a language. Until we are completely masters of a foreign and unusual idiom, we must, in all we say, take into consideration its peculiar character; in order to be intelligible, we must continually pay attention to the expression itself, and weigh *what* we wish to say with express reference thereto. Thus in every one of our utterances we are hampered by having to observe the formal rules of the language; we cannot tell unreservedly from our involuntary sentiments the state of our heart, *what* we feel, and what we perceive; on the contrary, we must, for their manifestation, absolutely mould our views and sensations on the expression, of which we are not such masters as of our mother-tongue, wherein, completely careless about the matter, we find the right expression as a matter of course without even willing it. I had now, however, thoroughly acquired the language of music; I possessed it as though it was really my mother-tongue, and, when I desired to communicate anything, had no longer to trouble myself about the formal part of the expression; the expression was always ready whenever I required it to communicate, according to my inward impulse, a definite view

* See *Musical World* for October 28, 1871.

or sensation. But we do not speak without exertion an unusual language quite correctly, till we have imbibed its spirit, till we feel and think in it, and thus desire to express in it exactly what, according to its spirit, can be expressed in it alone. It is not till we speak completely in the spirit of a language, till, quite involuntarily, we feel and think in it, that we gain the facility of extending the spirit itself, of enriching and expanding at one and the same time what is to be expressed at the same time as the expression."

Now comparing the two, composers and ordinary listeners, what do we find? With the former, sounds and their emotional significance are so bound up that one suggests the other with almost, if not quite, the precision which accompanies our use of speech to interpret thought. With the ordinary listener a tune, a theme, by no means necessarily means anything more than a tune. The average music-consumer does not make use of music to express his feelings as he makes use of words to express his thoughts. Hence in the minds of those to whom the musician appeals, that close connection between feeling and musical expression which consists of an inconceivably rapid and automatic translation of thought into tone and of tone into thought, is not established. The poet, the orator, the dramatist are more favourably placed; *their* language is quickly understood, for (as regards material at least, if not always as regards "form") it is substantially that in constant use among those to whom the appeal is made.

"It may be shown," writes Mr. Herbert Spencer, "that music is but an idealisation of the natural language of emotion, and that consequently music must be good or bad according as it conforms to the laws of the natural language. The various inflections of voice which accompany feelings of different kinds and intensities are the germs out of which music is developed."

Now, of course, it is true of all the arts, to say that they are but nature idealised; but in music the process of idealisation has been carried so far that, by the majority, the connection between these "natural inflections" and their musical idealisation is constantly lost sight of. Mr. Spencer admits this himself by instancing "the swarms of worthless ballads which infest our drawing-rooms." These, he says, "sin against science by setting to music ideas that are not emotional enough to prompt musical expression; and . . . by using musical phrases that have no natural relations to the ideas expressed, even when these are emotional. They are bad because they are untrue." It follows from this, of course, that there are many so-called composers who are only superior to their listeners in that they have a capacity for "music-making"—*i.e.*, stringing together platitudes, much

as a penny-a-liner does when writing for third-rate newspapers. Such "composers" are successful in a commercial sense for just the very reason that greater men fail. And the measure of success achieved by such works is an excellent standard by which to measure the width of that chasm which, with regard to the emotional element in music, lies between the composer of genuine capacity and the public. The only part of music which is universally comprehensible is that which we call its "form," that is to say, those aspects with which the ear and intellect are alone concerned. These of course consist of its melody, harmony, rhythm, and those larger aspects of the latter which result from the grouping together of smaller portions. Even here there is, as we all know, a vast different degree of appreciation between various hearers; but, allowing for this, the forms of music may safely be spoken of as not depending so much as emotional significance does on the fitness of those who listen.

I have just referred to those aspects of music with which the ear and intellect are alone concerned. This will show that I do not go so far as Mr. Spencer, who states that music is "but an idealisation of the natural language of emotion." The best music is this, truly; but it is not this alone, unless we are to accept the word "idealisation" as including the beauties of four-part counterpoint and the elaborate architectural structure known as the "Sonata form." No! the formal elements of music, those, that is to say, which appeal to our sense of symmetry and proportion, do not owe their origin to emotion, but to the "decorative" instinct in man; an instinct the origin of which must be sought, not in man's artistic nature, but in the very necessities of his existence as a part of the Cosmical whole. These formal elements of music (which are deducible from the principles of our tonal system) are so little emotional that it is possible to construct, by their means alone, and without the slightest prompting from an emotional stimulus, works which will pass current in many parts of the world as music. If, now, I have seemed to define what I understand by "music" at a length which has unduly taxed your patience, it is because the considerations I shall subsequently have to submit would otherwise not have been intelligible. Music then, we may take it, being an "objective register of subjective facts," must depend in the first place upon the nature of those subjective facts—that is to say, upon the nature of the musician's mind. But this is a truism, and I only formulate it for the purpose of reaching, logically, the next step in our investigation.

This is indicated by another sentence which I also derive from Mr. Herbert Spencer: "The evolution of the fine arts is a psychological process dependent upon social conditions." To treat such a subject as the evolution

of a fine art exhaustively, it would be necessary to show first that, as there was once a time when sculpture and painting were no more than parts of architecture, so there was a time when music, poetry, dancing, even the drama, were still constituents of one elemental and inorganic art. Perhaps, indeed, it would be necessary to show that there was a time when that art, which contained in embryo all the arts of to-day, was itself but a branch of what was not art at all, but religion and government; nay, that the difference between religion and government had itself not been recognised. But, however interesting, this must be left. Our survey of the evolution of music must be limited to a bird's-eye view of its progress as an independent art.

Now it is evident from what has just been said that the aim of the artist has not at all times been the same. His impulse, indeed, is always a *desire to express;* but the ends to which this is directed will necessarily vary. And the same may be said of the attitude of the public. While this is always a desire for delight, it may demand that art shall minister to the delight of its sensuous, its intellectual, its moral, or its emotional nature; or to any or all of these combined.

Then, too, it is evident that some artists will direct the public—some be directed *by* that public—and that at certain epochs one or other of these tendencies will dominate. Two illustrations will suffice. Bunyan's "Pilgrim's Progress" will supply an example of a work of art consciously used for a moral purpose; and in our own art Martin Luther will occur to you as a musician whose art was subservient to a higher purpose. It is not, however, always necessary that the use of art for the highest and most elevating purposes should be *conscious*. An artist may produce elevating works without having been conscious of more than a desire to express his own thoughts or feelings.

It is evident from even these few examples of the influences which are brought to bear on the production of works of art that the study of progress in music is not one to be attacked without serious preparation of a scientific kind. It would be unfair not to acknowledge the work done in this direction by Fétis, and, more recently, by some of the writers in Sir George Grove's "Dictionary of Music and Musicians," and by Mr. J. F. Rowbotham. That gentleman's "History of Music" is indeed the most remarkable attempt, as far as I know, hitherto made to classify and account for the innumerable facts which an ordinary history presents, and to supply the *lacunæ* which have hitherto stood in the way of a complete narrative of the progress of the art. Those of you who have read this book will, with me, have marvelled at the ingenuity of the author—will have been fascinated by the vivid pictures

he has drawn, by the beauty of many of his descriptions, by the remarkable insight constantly revealed, and by the important inductions drawn from apparently trivial facts.

But although Mr. Rowbotham's history goes far beyond the limits usually adopted in works of the kind, it does not profess to found a science of *musical* history in the sense that sociology is a science of *human* history; and it is just this that is wanting. Moreover, Mr. Rowbotham's generalisations are not always to be trusted; he lacks the accuracy without which science is a thing of naught. But his work might very well be used as material from which to formulate the nature of more general laws.

Having now treated the words Law, Progress, and Music separately, it remains to show the connection which exists between them. Viewing them in combination, the progress of music and the laws deducible from a careful observation of that progress would necessarily be our next step. But were we obliged to perform this operation it would be necessary to invite you not to hear me read one paper, but at the very least half-a-dozen. The inductive method, by which from particular instances we infer general principles, is surrounded with such immense difficulties when we attempt to apply it to the organisation of social and historical facts, that we may safely conclude it would never have led to the discovery of the laws which form what is known as the science of sociology, and which includes within its scope the development of fine art. The possibility of such a science is due to the conception that the laws of progress in natural phenomena are equally operant in human affairs; and, since, within the last hundred years or so, we have learnt to understand the processes of natural development, it has been possible to show that human progress is attributable to the action of the same forces, and that music is no exception to the rule. But having formulated the laws which constitute progress, or as it is better to call it "evolution," the history of music should be read with a view of testing the conclusions of science. No one, as far as I know, has as yet done this. Twenty or thirty years ago Mr. Herbert Spencer indicated his intention of doing it in the third volume of his "Principles of Sociology," but that volume has not yet been issued. But the work is not one which should be attempted by any but a thoroughly practical musician. However well acquainted with musical history, the scientific man can never be quite certain that he is not misreading facts. It will be easier for a musician to acquire the requisite scientific training than for the scientist to acquire the necessary musical training; for scientific knowledge of the laws with which we are now dealing has been rendered comparatively easy of attainment

by the labours of Mr. Spencer himself, to say nothing of other eminent workers in the same field.

What is now wanted then is a history of music which may truly be spoken of as "philosophy teaching by examples." We want a work which exhibits the action of the laws of evolution in each stage of progress arrived at by our art. Mr. Spencer, in the article to which I have referred already, "Progress, its Law and Cause," sketches the course of musical development; but he only makes use of it to illustrate *one* principle, the only one he had apparently discovered at that period. Since then he has altered the title "Law of Progress" to "Law of Evolution," and has shown that the principle laid down in the article on "Progress" is but one of several. I will read the passage in the article referred to :—

"In respect to that progress which individual organisms display in the course of their evolution, this question has been answered by the Germans. The investigations of Wolff, Goethe, and Von Baer have established the truth that the series of changes gone through during the development of a seed into a tree, or an ovum into an animal, constitute an advance from homogeneity of structure to heterogeneity of structure. In its primary stage, every germ consists of a substance that is uniform throughout, both in texture and chemical composition. The first step in its development is the appearance of a difference between two parts of this substance; or, as the phenomenon is described in physiological language—a differentiation. Each of these differentiated divisions presently begins itself to exhibit some contrast of parts; and by-and-bye these secondary differentiations become as definite as the original one. This process is continuously repeated—is simultaneously going on in all parts of the growing embryo; and by endless multiplication of these differentiations there is ultimately produced that complex combination of tissues and organs constituting the adult animal or plant. This is the course of evolution followed by all organisms whatever. It is settled beyond dispute that organic progress consists in a change from the homogeneous to the heterogeneous.

"Now, we propose, in the first place, to show that this law of organic progress is the law of all progress. Whether it be in the development of the earth, in the development of life upon its surface, in the development of society, of government, of manufactures, of commerce, of language, literature, science, art, this same evolution of the simple into the complex, through a process of continuous differentiation, holds throughout. From the earliest traceable cosmical changes down to the latest results of civilisation, we shall find that the transformation of the homogeneous

into the heterogeneous, is that in which Progress essentially consists."

Mr. Spencer then applies this law to music as follows:—"As argued by Dr. Burney, and as implied by the customs of still extant barbarous races, the first musical instruments were, without doubt, percussive—sticks, calabashes, tom-toms—and were used simply to mark the time of the dance; and in this constant repetition of the same sound, we see music in its most homogeneous form. The Egyptians had a lyre with three strings; the early lyre of the Greeks had four, constituting their tetrachord; in course of some centuries lyres of seven and eight strings were employed; and, by the expirations of a thousand years, they had advanced to their 'great system' of the double octave: through all which changes there of course arose a greater heterogeneity of melody. Simultaneously there came into use the different modes—Dorian, Ionian, Phrygian, Æolian, and Lydian—answering to our keys; and of these there were ultimately fifteen. As yet, however, there was but little heterogeneity in the time of their music. Instrumental music during this period being merely the accompaniment of vocal music, and vocal music being completely subordinated to words—the singer being also the poet, chanting his own compositions and making the lengths of his notes agree with the feet of his verses—there necessarily resulted a tiresome uniformity of measure, which, as Dr. Burney says, 'no resources of melody could disguise.' Lacking the complex rhythm obtained by our equal bars and unequal notes, the only rhythm was that produced by the quantity of the syllables, and was of necessity comparatively monotonous. And further, it may be observed that the chant thus resulting, being like recitative, was much less clearly differentiated from ordinary speech than is our modern song. Nevertheless, in virtue of the extended range of notes in use, the variety of modes, the occasional variations of time consequent on changes of metre, and the multiplication of instruments, music had, towards the close of Greek civilisation, attained to considerable heterogeneity—not, indeed, as compared with our music, but as compared with that which preceded it. As yet, however, there existed nothing but melody: harmony was unknown. It was not until Christian church-music had reached some development, that music in parts was evolved; and then it came into existence through a very unobtrusive differentiation. Difficult as it may be to conceive *à priori* how the advance from melody to harmony could take place without a sudden leap, it is none the less true that it did so. The circumstance which prepared the way for it was the employment of two choirs singing alternately the same air. Afterwards it became the practice—very possibly first suggested by a mistake—for the second

choir to commence before the first had ceased; thus producing a fugue: and with the simple airs then in use, a harmonious fugue might not improbably thus result. The idea having once been given, the composing of airs productive of fugal harmony would naturally grow up; as in some way it *did* grow up out of this alternate choir-singing. And from the fugue to concerted music of two, three, four, and more parts, the transition was easy. Without tracing in detail the increasing complexity that resulted from introducing notes of various lengths, from the multiplication of keys, from the use of accidentals, from varieties of time, and so forth, it needs but to contrast music as it is with music as it was to see how immense is the increase of heterogeneity. We see this if, looking at music in its *ensemble*, we enumerate its many different genera and species—if we consider the divisions into vocal, instrumental, and mixed; and their sub-divisions into music for different voices and different instruments: if we observe the many forms of sacred music, from the simple hymn, the chant, the canon, motet, anthem, &c., up to the oratorio; and the still more numerous forms of secular music, from the ballad up to the serenata, from the instrumental solo up to the symphony. Again, the same thing is seen on comparing any one sample of aboriginal music with a sample of modern music—even an ordinary song for the piano; which we find to be relatively highly heterogeneous, not only in respect of the varieties of pitch and length of the notes, the number of different notes sounding at the same instant in company with the voice, and the variations of strength with which they are sounded and sung, but in respect of the changes of key, the changes of time, the changes of *timbre* of the voice, and the many other modifications of expression. While between the old monotonous dance-chant and a grand opera of our own day, with its endless orchestral complexities and vocal combinations, the contrast in heterogeneity is so extreme that it seems scarcely credible that the one should have been the ancestor of the other."

But, some years later, when he developed this theory, Mr. Spencer showed that "differentiation" and the consequent change from homogeneity to heterogeneity were themselves but a consequence of the operations of Force. Thus: "when a uniform aggregate is subjected to the action of a uniform force, its *constituents*, being differently acted upon, are differently modified." But the force itself is divided, by conflict with matter, into forces that widely diverge. Thus we have as a result the law which is known as the "*multiplication of effects*"; for the differentiated forces produce of course further secondary differentiations in the matter—*one re-acts on the other.* Naturally those constituents of each aggregate which are alike are similarly influenced, and thus

we get what Mr. Spencer calls *segregation*. The definiteness of this process of separation is of course in proportion to the definiteness of the difference between the units which are unlike; and, as a matter of course, the same cause which separates *unlike* units unites those which are alike, and thus we get the law of "Integration" or "Aggregation." The process so far is one from incoherent homogeneity to coherent heterogeneity; from the simple and indefinite to the complex and definite; from that which is inorganic to that which is organic—that is to say, *from that, the parts of which are more or less like the whole, to that, the parts of which are unlike the whole.*

To express this in another and perhaps still clearer way: Whilst all evolution is a change from the homogeneous to the heterogeneous—or rather, since homogeneity does not exist, a change from the less to the more heterogeneous—it is at the same time a change from the indefinite to the definite; and, besides changing from simple to complex, it also progresses from confusion to order, from undetermined to determined arrangement. Parts are not only multiplied, but more distinctly marked off from one another (*i.e.*, varieties which began at the outset become more and more marked as the process continues), and while an advance in heterogeneity results from progressive differentiation, an advance in definiteness results from progressive integration. There is not only a growing *multiplication of parts*, but a growing *one-ness in each part* (as, for example, petty tenures combine into feuds, feuds into provinces, provinces into an empire). Integration takes place either by means of (1) the junction of adjacent parts performing like functions; (2) the monopoly of one ("survival of the fittest"); or (3) the concentration of many similarities by affinity. "Integration is seen in art as the subordination of parts to a whole. We see this in music, where the monotonous repetition of a few notes heard in the chants of savages becomes in civilised music a long series of phrases, different but combined into one whole, and so completely integrated that the melody cannot be broken off in the middle without offence to the ear. And in the vast ensemble of a musical drama, where the artistic perfection largely consists of the subordination of *particular* effects to the general effect, the process is carried to the highest degree."

Two laws remain to be mentioned. One is that forms are determined by the resistance opposed to the growing force. Motion takes place, very naturally, in the direction of the line of least resistance; so that all form results from *growth under limit.*

The other law asserts that all motion is periodic or rhythmic; that, given the existence of antagonistic forces, the

result must be a perpetual alternation of states. This brings us to the final result, namely, that the processes of evolution eventually arrive at a stage of "equilibration," and thence proceed to reverse the process by which they came to perfection. This, which is known as "dissolution," is as inevitable in the arts as in the animal kingdom, and is always accompanied by the same symptoms—that is to say, the obliteration of distinctness and order, the overthrow of that form of integration which consists of the subordination of parts to a whole and a return from organic complexity to inorganic simplicity.

Thus the old Greek was right, though right in a sense which he probably little suspected, when he said, "Rhythm rules the world."

DISCUSSION.

THE CHAIRMAN.—Ladies and gentlemen, it will be our first duty to return our thanks to Mr. Jacques for the paper with which he has favoured us. It has ranged over a variety of subjects dealing with the laws of æsthetics as applied to music, but intermingled with these observations are many directly concerning the art of music. I will ask you to speak on some of the matters on which he has touched, but before doing so we will return him our thanks for the paper he has read. (The vote of thanks was passed unanimously).

Mr. SHEDLOCK.—I feel that this is a matter which one requires to think over. With regard to the laws of differentiation and integration, which Mr. Jacques explained, we want to have time to compare them with the history of music, and to see how they explain the seventeenth and eighteenth century music, and the return to the simplicity of Mozart. Since that time we seem to have got more complex, which I suppose is a process of differentiation. As to what the future will be, no one can say.

Mr. J. A. FULLER MAITLAND.—One point struck me in the paper, and that was that the course of music seems to have been treated as a simple course, whereas I think the history of music shows that something very different has been the case—that is to say, there have been periods of music when a style of elaboration was in vogue, compared to which our modern elaboration really seems as nothing. There are compositions in existence now that no committee of the most competent antiquaries could possibly decipher, although the notes are perfectly clear, and we know the general rules which govern their notation; they are so complex that I believe no one has been able to get anywhere near a proper solution of their difficulties. To imagine what musical culture must have

been when people could sing such works as these from the single parts is quite impossible. I am speaking of a period considerably anterior to the madrigal period, although the music of that time was of course infinitely more complex than that which immediately succeeded it. The revolution of 1600 completely changed the course of music from the greatest complexity to the greatest simplicity. Surely that was a retrogression, as Mr. Herbert Spencer would say, rather than a progression? I do not quite see how the series of altitudes and progressions can be all brought into one great law of progress.

Mr. JACQUES.—I think they can. At the end of my paper I particularly drew attention to the fact that there was a series of rhythms, that this rhythm was continuous, that there was periodicity, and that dissolution took place when once a certain equilibrium was arrived at; and that after decay we had what is generally known as a "Renaissance." I suppose I did not sufficiently emphasise that.

Mr. MOSELEY.—I think we ought to be extremely indebted to Mr. Jacques for this lecture that we have heard, and it appears to me that it reflects not alone great credit upon him, but, if you will permit me to say so, upon the Society, that is to say, that such a Society should exist where such a lecture can be given. To my mind, music can never take her proper place amongst the arts until such time as we deal with her and regard her from a philosophic standpoint. It is the great misfortune of musicians that they have not yet taken the place to which they are entitled, by reason of the fact that music hitherto has been regarded by the outside public purely as an amusement, and generally in an unscientific spirit. But from such a lecture as we have heard to-day, we see that it can be treated in a truly philosophic way. It seemed to me that Mr. Jacques' ideas were cast entirely in a philosophic mould, and that a scientific spirit pervaded them. He evidently felt the vastness of the subject with which he was dealing, because he did not dwell upon some matters which no doubt would have been of equal interest. With regard to some of his observations, I should like, if I can, to substantiate what he says. He tells us that a great gulf exists between the public and the musician, a statement that will be endorsed by any one who frequently attends concerts in this and even in some other countries. He talks of the public as the consumers of music. I think that was an accurate description, and in that capacious maw is swallowed up any amount of rubbish, and chiefly rubbish. We have a bewildering diversity of programmes, and the greater number of persons who listen to the music do not understand it; if they did, they would be extremely fatigued after hearing one-tenth of it. Mr. Jacques

has quoted pretty frequently from Mr. Spencer, and he seems to give him a general approval. Musicians are indebted to Mr. Herbert Spencer for the scientific methods he has applied to their art, but I would ask Mr. Jacques whether he can justify by authority or by reason the suggestion of Mr. Spencer that the fugue was the result of chance; that in the commencement the alternating choirs sang, and by accident one sang after the other, and consequently the fugue was the result; and that from the fugue sprang harmony. So far as I as an amateur am able to judge, I should think—but of course I speak under correction, and with diffidence in the presence of so many musicians of the highest eminence—that Mr. Herbert Spencer must have fallen into a very grave error, and, like many others who have written on music—scientific men such as Schopenhauer—had not sufficiently studied the history of the art with which he was dealing. I should also like to ask Mr. Jacques if he could in a few words apply the law of progress to music, and show us in what way it operates, and tell us his own impression with regard to the present state of music—whether it has yet arrived at that stage where it is in a state of equilibrium, or whether decadence has already set in.

The CHAIRMAN.—I made one or two notes during the time Mr. Jacques was speaking, but the subject is too vast to deal with adequately in the course of our brief discussion. The question we should ask ourselves is—What constitutes progress? because that which some may deem progress, others may think retrogression. We have many musicians who believe that it is impossible to go beyond the condition of the art as Beethoven left it, and they consider that after that, or rather after the period of Mendelssohn, a certain amount—an over amount—of "freedom" showed itself, and that they regard as a backward step. So one of the first things we should have to settle would be—What is the meaning of progress? I quite agree with Mr. Jacques in pointing out that the various inflections of the voice were the germs from which all music was derived. Undoubtedly that is so with regard to early music of the Church, but beyond the music of religion another factor was at work. I take it that the music of the minstrels, who were so popular in the various countries of Europe before and during the Middle Ages, was very different from that of the Church, and I cannot but think that the union of the strict style of the Church with the freedom of the minstrels was the source from which our modern music was principally derived. With regard to the statement of the last speaker as to the gulf between the artist and the public, I think that such a gulf will always exist. It must be so. One devotes his life to the art, and devotes it not only for the means of obtaining a livelihood, but in many cases

because his artistic temperament compels him to do so. Musicians feel that it is the language of emotion by which they express their thoughts. But is not that gulf to a certain extent becoming bridged over by the active educational process that is going on? It seems to me that musicians now play recondite works that a very few years ago would hardly have been listened to; but now you find concerts, at which high class music is performed, attended by appreciative audiences. I think that to a great extent that is to be ascribed to the educational work that has been going on. As people acquire more knowledge generally, they also gain more knowledge in music, and are thus enabled to appreciate that which in old times their forefathers could neither appreciate nor like. With regard to the philosophy of music which Mr. Jacques has spoken about, I would ask the members to remember that the subject has been treated, and with some felicity, by a Member of this Association, Dr. Pole, who has written a work called "The Philosophy of Music." I am afraid the book is not so well known as it ought to be, and I commend it to your notice. It endeavours to deal to some extent with the æsthetic side of the art.

Mr. Jacques.—Is it not chiefly acoustical?

The Chairman.—But it is also partly æsthetic. Mr. Jacques mentioned another book, Mr. Rowbotham's. I cannot but refer to that work in a very different way to what Mr. Jacques does. He certainly did say it was rather inaccurate, but I venture to say it is very inaccurate. It is one of those books in which the writer has drawn on his imagination and exhibited his power of romance more than in any that I know. As to the happiness of the style I will not say very much about that, but if you open any page of the third volume I will undertake to say that almost every sentence begins with the word "and," which struck me was not a very happy style. With regard to its accuracy, may I say that lately having occasion to make a study of musical notation I referred to the book, and noticed there an example from the St. Gall manuscript. I had lately seen a photograph of this famous manuscript, and it struck me the letters given were not like those of the St. Gall manuscript, and indeed the pneumes differed also. When I came to examine the reputed fac-simile more closely, I saw it was not like the letters we have in the St. Gall manuscript, and the pneumes differ considerably. Now when you get something which is supposed to be a fac-simile of an old manuscript, and you find it in that incorrect state, my idea is to close the book and go to some other authority.

Miss Prescott.—Are not fac-similes often very inaccurate?

The Chairman.—I believe so-called fac-similes (unless photographs) are often inaccurate. I mention that one as

being a bad specimen. I agree with Mr. Jacques as to drawing-room ballads. Undoubtedly they do not represent progress; they do no credit to the composers who issue them, nor to the music shops that publish them. I do not know whether it was a quotation from Mr. Spencer in which Mr. Jacques referred to an Egyptian lyre with three strings.

Mr. JACQUES.—Yes, the whole of that musical passage was a quotation.

The CHAIRMAN.—I am afraid Mr. Spencer has not gone into the subject as a musician would. Instead of the Egyptian lyre having only three strings, at a very early period we find drawings on old tombs of most remarkable harps and lyres. One harp has twenty-one strings. When that discovery was first reported, it was thought to be merely a traveller's tale, but it has since been proved to be quite true, and you will see drawings of this wall painting in every history of music. Engel gives one, and there is an exact representation of the picture in the Egyptian room at Berlin. The figure playing is very remarkable: he is not picking out one note, but his fingers are thrown over the whole range of strings, as if he were playing either an arpeggio or a chord. Certainly the Egyptians had more than three strings to play on, and that at a very early period of their history. We shall all agree as to the evolution of music. Of course it must follow, to a certain extent, the same course as all other arts; it must have been evolved from simple forms until it arrived at its complex state. The difficulty seems to me to settle when perfection is reached, and then, when decadence sets it. Music being the youngest of the arts, she has probably taken the longest time to arrive at anything like perfection. I would reiterate the question asked—Whether Mr. Jacques thinks that period has set in, or if not, when it is likely to do so? It is quite true that in the beginning of his paper he alluded to the alterations which have taken place in form; but we ought to be guarded in laying down laws, or formulating a thesis that at one particular period these laws are absolutely perfect, that they ought to be obeyed, and can never be altered. That has not been so in music. You know there was a time when our ancestors could not possibly bear the chord of the seventh, and some of the inversions of that chord, even in later times, were looked upon as dreadful. Indeed, there are many chords heard now that we have not quite got used to. Is not that after all a process of ear education? Is it not the fact that we now listen to passages formless, rhythmless, and with harmonies that our ancestors could not possibly have borne? I do not know whether that is to be regarded as a matter of progress or not.

Mr. JACQUES.—With regard to what Mr. Fuller Maitland said, I think I have replied to his remark. There was

perhaps a little misconception because I had not sufficiently accentuated the fact that I considered this rhythmic periodicity referred to the progress of the art. Mr. Maitland, and perhaps some others also, understood that I meant it simply to refer to the musical form. But I mean, as Mr. Spencer does, that it applies to *all* progress. Just as living beings are born, grow, and die, everything else is born, grows, and dies; and consequently the arts. That of course opens up the question which you naturally asked me to answer—Whether we are now in a state of decay or not? I may have my own opinions on that subject, but I do not feel it would be wise or right to dogmatise upon it here. It is one of the most ticklish of all subjects, and cannot be solved by a reference to personal feelings or tastes. The chief object of my paper was to help towards giving a more stable position to our notions of progress. We are too much at the mercy of mere personal bias when judging this question, and consequently do very little more than attack one another when our tastes are dissimilar; or "agree to differ," if we happen to be very amiable. It does not seem to me that we get very much farther than that; and I wished therefore to, at any rate, suggest a method of investigation which might lead to a settlement of what "progress" really means. That was Mr. Spencer's object in writing his essay. Witness the following passage: "The current conception of Progress is somewhat shifting and indefinite. Sometimes it comprehends little more than simple *growth*—as of a nation in the number of its members and the extent of territory over which it has spread. Sometimes it has reference to *quantity*. . . . Sometimes the superior quality of . . . products is contemplated; and sometimes the new or improved appliances by which they are produced. When, again, we speak of moral or intellectual progress, we refer to the state of the individual or people exhibiting it; whilst when the progress of knowledge, of science, of art is commented upon, we have in view certain abstract results of human thought and action. Not only, however, is the current conception of progress more or less vague, but it is in a great measure erroneous. It takes in not so much the reality of progress as its accompaniments—not so much the substance as the shadow. That progress in intelligence which takes place during the evolution of the child into the man, or the savage into the philosopher, is commonly regarded as consisting in the greater number of facts known and laws understood; whereas the actual progress consists in those internal modifications of which this increased knowledge is the expression."

The nature of that progress was clearly shown by the other laws I have described—increased definiteness, coherence, and so on; and it seems to me that you can apply these to

music for yourselves. It is of course absolutely impossible for me to do that to-day. It would take another two lectures at least, because it would have to be very carefully done, and an enormous number of details would have to be taken in, to avoid errors. But you can do that for yourselves. Take, for instance, the "sonata" form. There it seems to me that these laws are magnificently exemplified. There was first a little piece with only one subject, which differentiated into tonic and dominant portions. These became more and more definitely marked off from one another, and finally developed into two separate themes. I am now touching a topic upon which Mr. Stephens could say a great deal more than I can. Of course each portion of the sonata has in the same way ultimately become more differentiated from the others, and you can see the progress and the transition. You see it very well in Haydn's early works, the second subject really not differing from the first, the same thematic material being used, the only difference being in the keys. Other forms may be traced in the same way. The sonata form is much more organic than the rondo form, it is much more elaborate, and there is much greater subordination of the parts to the whole. Then again I need not say that the fugue is coherent and complex in a very high degree, and comes under the head of works which cannot be broken off without leaving a sense of incompleteness, while all music which consists of little bits stuck next to one another like bricks in a wall shows a lower form altogether. I may instance again that it seems to me a great many composers of the present day, under the impression that they are "developing," are just falling into that very thing, and I should be inclined, but I put that forward with great diffidence, to regard that as a relapse, or at least the beginning perhaps of a renaissance. Where, for instance, it appears in "classical" music it is made out of national elements, as in Grieg, and so on, where you have such a number of little bits. For instance, I should put that as the opposite extreme, say, to some of the passages in Wagner's later works. I do not mean the recitative, but the more lyrical portions of his works, such a melody, say, as the "Preislied" in the "Meistersinger." From the beginning to the very end of it there is hardly a place where you can break off, and there is only enough indication of the cæsura to make the phrasing intelligible; it is all wonderfully "integrated." Then, on the other hand, you find in Schumann it is not so. I do not advance this in the least as derogatory to Schumann's manner of composing, because he did it in a beautiful manner. It is quite an individual style, but there are numbers of cases, as I need not tell any of you, where there is simply an alternation of little bits with only just a slight change of key. This seems to be a little piecing

together of bits; they have not grown. If you compare that with some of his larger works, where he succeeded in weaving longer sentences, as in his concerto and symphonies, you see the difference at once. With regard to Mr. Moseley's strictures on Mr. Spencer's remarks about the fugue, I have not a word to say; firstly, because Mr. Spencer is well able to take care of himself; and secondly, because I feel the weakness of that portion myself, and I emphasised the fact as I thought by my tone of voice when reading it, and by saying that it would be far better for a matter like this to be taken up by musical men. We shall be very glad if Mr. Spencer will bring out the book so long promised, in which the progress of music is to be treated; but I feel certain it will not be entirely satisfactory to musicians. The art of music is so difficult that anything so important as its progress must be dealt with by an exclusively musical man. He must, however, have acquired a scientific training, which does not seem to me so difficult as it was in former days, because a little careful study of one or two of the books of Mr. Spencer will enable any ordinarily intelligent man to master the system of these laws, and he can then apply them for himself, and, if he be competent to do so, write a book. Mr. Southgate instanced something with regard to the Egyptian harp. I was struck with it the moment he mentioned it. The very fact that such a complex instrument existed convinces us that this could not have been an early stage of Egyptian art, whereas if we had no laws to go by, we should not know for certain whether the early stage were likely to produce anything with a great number of strings or a few. By the application of these Spencerian laws we can almost venture to erect the history of music during times of which, from want of documentary evidence, history is now completely lacking. We can erect it by analogy, we can supply the lacunæ, which would be impossible without some laws of this kind. Of course historians have commonly skipped over these blank portions of history, and said—"We do not know, there are no tunes existing, and unless we have some documents we cannot tell what kind of music these people were likely to have had." But if we master these laws thoroughly, it seems to me we *can* tell. We may not re-produce the exact tunes, but we can form a very accurate idea of them. The last remark that Mr. Southgate made with regard to the ear is undoubtedly true, only I would point out that the ear would naturally be also subject to evolution from the simple to the complex. I think the existence, for instance, of the pentaphonic scale in the old days indicates that. The chromatic scale implies a very *advanced* condition. The chromatic scale, employed merely as a chromatic scale without any unifying principle, I should regard as a decadence, because it

would be a tumbling back again into the incoherence of the early days. But we do not use the chromatic scale in that way. *It has no tonality of its own.* We use the chromatic scale merely as a kind of decoration of the diatonic scale, with the ordinary tonality of major and minor. We always keep that as a base, and it is the major and minor tonality that we always hear when we listen to chromatic harmony; the chromatic alternations are only deviations from the diatonic scale. It is this, of course, that maintains coherence; so that if you asked me for my personal opinion I could not possibly regard the extreme chromaticism of the present music as a sign of decadence until I saw that it produced confusion in the tonality. I do not mean to say there is never any evidence of that, but I do say it is not necessary, that it has only arisen by the bungling of the composer.

Mr. Shedlock.—May I say one word more? It appears from the few remarks Mr. Moseley addressed to the lecturer, and from his answer, that he has only at present accomplished half his task. He has given us a few samples of the manner in which he applies his laws, he has gone to the fugue form and the sonata form, and to that of a still earlier period; but we are all more interested, and very naturally so, in what is taking place in our own day. Mr. Moseley suggested that we ought to know just where we are at the present moment, whether our period is one of differentiation or disintegration, or what it is. So it seems to me that Mr. Jacques should read us another paper, applying the laws he has been dealing with, and bringing them and their outcome down to date.

The Chairman.—I think we shall all be able to echo that opinion, and I hope Mr. Jacques will complete his studies, and give us the result next session. Allow me to say, when Mr. Maitland was speaking of complex music, I had in my remembrance, only I forgot to mention it, that very long ago music did certainly exist much more complex than it does now. I do not know whether that is what was passing through his mind, but I would call attention to the fact that Tallis wrote a song in forty parts, and if I remember right, Master Anthony Giles, the Master of the boys of the Chapel Royal, wrote in thirty-eight parts. Dr. Bull also has written music in a great many parts. I hardly know how these examples would apply to the laws we have heard sketched to-night. If music had attained to so complex a condition, how is it we have got rid of all those many differently moving parts, and have reduced it to a supposed simpler condition? for nobody now writes in forty parts. One word as to the fugue theory. Of course Mr. Spencer is wrong, he has not read up musical history, and therefore did not know that the first form of harmony is that dreadful fifth business, which we

have probably played once, but never more. In De Coussemaker's *Histoire d'Harmonie au Moyen Age* there is an example of Jean de Garland, in which the passages are sung first by one voice and then another, which he calls a repetition of different voices. It is a remarkable little piece of harmony, and not of the early type of the parts moving in parallel motion, but mostly in contrary motion. I do not quite know the date of Jean de Garland, but I should imagine about the tenth or eleventh century. Just one word also with regard to the statement as to Wagner. He says in his book he is the master of the art of expressing himself, and can tell us just what his feelings are. One can quite understand that; but the art of the composer is not so much to be able to express the feelings that animate his own bosom, as to be able to reveal those feelings to others. It is useless, it seems to me, for a composer to express feelings which others cannot understand. The great preacher, Edward Irving, talked in unknown tongues, and no doubt it was very wonderful to himself, but the general public could not understand his sentiments. Of course the Egyptians first of all must have had a harp with one string, then two or three, but at a very early period they had this splendid harp I have referred to.

MAY 6, 1889.

MAJOR G. A. CRAWFORD

IN THE CHAIR.

THE CHAIRMAN.—The minutes which have just been read contain a letter from Mrs. Monk with reference to the loss the musical profession sustained in the death of her husband. I am sorry to say that at this meeting we have to announce another loss to the Association in the death of our President. Sir Frederick Ouseley was President of this Association from its commencement. He took the greatest interest in its welfare, and gave us the benefit of his very extensive knowledge and learning whenever it was possible for him to do so. I feel certain that his loss will be looked upon by this Association as a very great one. We have suffered heavily by death within the last eighteen months. We have lost three of our Vice-presidents and now our President. I think some expression of our regret at Sir Frederick Ouseley's death should be passed by the Association, and perhaps someone will move a resolution to that effect.

Mr. WALTER WESCHÉ.—I beg to propose that a vote of condolence and sympathy be sent to the members of Sir Frederick Ouseley's family from the Association.

Mr. HOPPER seconded the resolution, which was unanimously agreed to.

RATE-AIDED SCHOOLS OF MUSIC.

BY ARTHUR HILL, B.E., M.R.I.A.

As an introduction to the immediate subject of this paper—namely, "Rate-Aided Schools of Music," it is necessary briefly to allude to the present condition of musical education in the kingdom. But as I propose dealing altogether with the relationship of the State to music, no reference need be made to the characteristics of the music teaching obtainable

by the classes who can afford to pay for special instruction either at private schools or at home.

In the first place, in the elementary school, music is acknowledged and supported by the State in the form of payment on results. In England and Wales, and also in Scotland, where the same code applies, a payment of 1s. per head of the average school attendance is made where the children can give some evidence of understanding written musical characters, and can sing from sight to a small extent. Where music from note is not taught a payment of 6d. is made for singing by ear three or four songs previously learned, which one can scarcely designate as musical teaching at all.

According to the last published report of the Education Commissioners, out of the total number of schools in England and Wales in which examinations were held, but eighty-two schools were returned as not teaching music at all, and in only ninety instances was the teaching so insignificant that no grant would be allowed. These schools were all very small, with an average attendance of from thirty to fifty scholars.

The 1s. grant was made in 12,769 schools or classes, with an attendance of 1,959,299 children, the average attendance being 153 scholars to each school; and the 6d. grant was made to 21,167 schools, with an attendance of 1,584,540, the average attendance in these schools being 75. The payment according to these figures being—

For singing by note	£97,814 19
For singing by ear	39,613 10
Total	£137,428 9

So that for the purpose of teaching music in elementary schools in England and Wales alone, the Parliamentary grant exceeds the very handsome figure of £137,000 a year, and taking into account the cost of teaching music in the training colleges (of which there are forty-three), examinations and proportion of official expenses, &c., the total cost to the State is not less than £150,000 a year.

I have not been able to ascertain the exact amount of the grants made to Scotch schools under the head of music, but assuming the figures to be in proportion to population the amount would be over £21,000 a year. This sum is probably within the real expenditure, for in Scotland a larger proportion of schools sing from note than in England and Wales, the proportions being—In English schools 63·8 per cent. sing from ear, and only 36·2 per cent. sing from note; while in Scotland 32·6 per cent. sing from ear, and 67·4 per cent. earn the higher grant of 1s.

In Ireland the position of music in the national schools is different. Vocal music is not a general school subject, but is

"optional." No payment is made for infants, but from the second grade upwards sums varying from 1s. 6d. to 2s. 6d. and 3s. for the highest grade are made, not on average attendance but on individual children, the examination of course being individual so far as the sight-singing tests are concerned. Out of 8,112 schools under the National Board, music is taught in but 1,093, little more than one in eight; 67,767 children were presented for examination, of which eighty per cent. passed, securing a total payment of £6,314 5s. 6d. A payment is also allowed for instrumental music, but the earnings under that head are very small. There are four training colleges where music is taught, and taking these into account, together with an allowance for cost of examination, which is double what it is in England, the total expenditure on music in Irish national schools is between £7,000 and £8,000 a year.

In the face of such an expenditure as this in elementary schools, no one can pretend to say that the national exchequer does not recognise music. That the full benefit of this large outlay is not realized is generally understood, and efforts to improve have not been wanting in the past; but so long as certain radical defects exist, improvements can be but slight.

In the first place, the training of the teachers is very important. Although in large town schools professional musicians are sometimes employed (more particularly in Scotland), still small country schools must depend on the ordinary teacher for music as well as other subjects. A small proportion of School Board teachers spend two years studying in a training college where music forms part of the educational course. To those who have not learned music before entering the training college, or who have been badly taught, the time is too short to develop efficient teaching-power, and those who have not even this advantage must pick up the elements of music as their means or opportunity may admit. Their competency to teach and earn result payments is judged solely by the performance of the pupils. And the examiner himself is but one of the ordinary school inspectors and not a professional musician.

Then, in the official instructions, the examiner is directed not to apply any test "to individual children"; that in cases where he may notice "*one* or *two* voices unduly leading the bulk of the children such voices may be silenced for a time." An examination conducted in such a manner must be exceedingly imperfect, and have a damping effect on the ardour of a really musical teacher or a clever pupil. More thorough examination by special professional examiners is much needed; good teachers would be stimulated, and even feeble or indifferent teachers would be helped thereby.

Amongst the present school inspectors many happen to be excellent amateurs, and no doubt do all they can towards improving the status of music in the school; but the whole system needs revision in order that the country may get value for the money that is spent.

Beyond the very elementary singing encouraged in Board Schools by the annual Parliamentary grant for educational purposes, intermediate or middle class music teaching is not recognised in any way in England or Scotland, although Irish towns or boroughs have the privilege of taxing themselves for the purpose.

Amongst the institutions existing for the higher class of training we have two that have been in existence for many years, both acknowledged and subsidised by the State to some extent—the Royal Academy of Music, London, which receives an annual grant of £500, and the Royal Irish Academy of Music, Dublin, which gets £300 a year. But outside the domain of private enterprise there is no organisation to train music students and to occupy a position intermediate between the elementary schools and the Royal Academy and other colleges in London, where the highest class of teaching is given.

Now, in ordinary education, a clever child can, under certain conditions, win his way from the primary school to the University. There are 209 art schools scattered throughout the three kingdoms, really intermediate schools, largely supported by the State, through the Science and Art Department, South Kensington, where those who desire to cultivate, either for profit or for enjoyment, any talents that they may possess, can see good models and obtain good teaching at very moderate cost; besides affording to those who are endowed with special abilities the opportunity, through the medium of scholarships, of studying amongst the treasures of South Kensington Museum itself. Why should not music be placed on a similar footing and enjoy similar advantages? The *relative* importance of art or music does not really enter into the question. Possibly in itself art would demand prior consideration, but when we consider the actual position at present occupied by music, and take into account what, for the sake of distinction, I may call the private expenditure on music in the kingdom for church purposes, for public performances in the concert room and the theatre, besides teaching in all its various channels for home enjoyment, and then the number of people who are connected with the manufacture and sale of instruments, printing and publishing, &c., the extent to which music enters into the daily life of the country is something enormous; so enormous and so important is it that music on these grounds alone is fully entitled to more consideration from the

State than it now receives, not merely in the form of pecuniary assistance, but also in organisation and control. The importance of art is great from a trade point of view. Music, from a social standpoint, has also well recognised claims, claims which, in fact, Parliament has already acknowledged by making an annual contribution of about £180,000 for elementary teaching and £800 towards Academic instruction. The point so far is already conceded, and it remains but to carry the principle to its logical conclusion, and follow up the systematic teaching of music by establishing in suitable places provincial or intermediate schools of music which would form a link between the elementary schools and those institutions where the highest class of training can be given.

An institution established for a special purpose has naturally more force than unorganised individual effort, and there can be no doubt public schools of music in the chief towns throughout the country would have a marked beneficial effect on the music of the nation in a few years. Each school would be a centre of good music in its own locality, to systematise and direct studies into proper channels. It would influence the neighbouring elementary schools—first, by training the teachers; and secondly, by supplying from its staff of professors men who could be utilised as local examiners. It would help students of exceptional talent by means of scholarships to pursue their studies in wider fields.

I am not advocating an experiment, for an institution of the kind has been in existence in the City of Cork for ten years; indeed, in a few weeks it will have completed its eleventh session, and what has been done in a small and poor town in the South of Ireland can be much better done in the large and wealthy towns of England. The idea of teaching music publicly and aiding poor students of talent to cultivate their gifts was first suggested to me by the late Mr. N. D. Murphy, then Member of Parliament for the City of Cork, at a time when we were both connected with an amateur musical society. The means and scope of the society utterly precluded any attempt being made in that direction at the time, but a few years afterwards a movement took place for the improvement of the local art school which afforded the desired opportunity. Owing to a defect in the Irish Libraries and Museums Act of 1855, under which the Cork School of Art existed, it was found necessary to get a short Amendment Act passed, which after taking the necessary powers for art, Mr. Murphy availed of for the purposes of music, by introducing a clause to the effect "that the terms Science and Art in the principal Act shall be deemed to include the Science and Art of Music."

So, in 1877, Parliament defined music to be both a science and an art and legalised the expenditure of local rates for its

support in Irish cities and towns. Ireland has thus an advantage with respect to musical education not yet enjoyed by England or Scotland.

Immediately on the passing of this Amendment Act, steps were taken to open a public School of Music in Cork that should, in its own particular field, occupy a similar position to the School of Art. On an appeal being made to the Corporation they gave their assent to the scheme, and in accordance with their powers appointed a general Committee, consisting of about fifty citizens of all shades of political and religious views, to manage the existing School of Art and the proposed School of Music, and assigned to them an income to the full extent permitted by the Legislature—a step which was afterwards endorsed by a public meeting of ratepayers. During the year 1878 the Committee of the Music Department held many meetings, and after a lengthened correspondence with many eminent musicians of London, Dublin, and elsewhere upon the principles which should govern the proposed Institution, framed a scheme upon which it has been successfully worked since, and which has proved itself eminently suited to the objects in view. The prospectus which was drawn up at the time contains the following paragraphs, setting forth the general arrangement of the school:—

"The primary object of the Cork School of Music is to provide a systematic course of instruction on correct principles.

"That the advantages may be brought within the reach of every one, classes will be held in the day time, and also at night, arranged at different times for both male and female students.

"Pupils will be divided into three degrees of proficiency —viz., junior, senior, and advanced. Promotion from one to the other being dependent on the results of a general examination, which will be held at the end of the spring term, conducted by an examiner of experience, to be appointed for the purpose.

"All students will be required on entering the school to attend the junior course of solfeggio and sight singing, and on passing that, to study for a second year in the senior course, which will include the principles of harmony as well as a higher class of solfeggio. The third year, or advanced course, will embrace a continuation of the study of harmony and musical form.

"Instruction in the pianoforte, singing, organ, string instruments, &c., will be given to classes of three pupils for an hour, each pupil being present during the whole lesson. This method, which is that universally adopted in similar institutions abroad, and known as the ***enseignement collectif***, pos-

sesses many advantages, and is more instructive to a pupil than a solitary lesson of any length.

"A Diploma will be awarded to those who shall successfully complete their 'advanced' course of study, and show satisfactory proficiency in an instrument or voice cultivation."

Then as to the arrangement of classes and fees. The classes are divided into two groups, the obligatory departments of solfeggio and harmony, and the optional subjects of pianoforte, voice cultivation, and violin. The organ, though it is named as a department on the face of the prospectus, for want of means has not yet been developed.

Concurrently with the essential solfeggio and harmony work a student may learn the pianoforte or violin, or take lessons in voice cultivation on payment of special fees. The fees charged for the day classes are generally about double what is paid by the night students; in fact, the night students pay less than what the teaching costs, so far receiving a distinct benefit. A profit is made on the day students, a class who can generally afford it, and this profit is sufficient to meet the loss on the night classes, so that in the end the school does not suffer any loss. No difference is made between night and day classes in the payment of the professor, so that his interests are exactly the same in regard to both classes of students. The fees are fixed at such a moderate scale that a night student can work through the standard three years' course, and obtain two lessons a week in the violin as well, for £5 10*s.* per annum, while the cost to a day student for the same course would be about ten guineas.

The following tables give the exact charges for the different classes:—

SOLFEGGIO AND HARMONY DEPARTMENTS.

FEES FOR THE YEAR.

	NUMBER OF LESSONS.	DAY CLASS.	NIGHT CLASS.
Junior Course. 1st Year.	50 Lessons in Junior Solfeggio*	£2 0 0	£1 0 0
Senior Course. 2nd Year.	30 Lessons in Senior Solfeggio 30 Lessons in Harmony† ..	£2 10 0	£1 0 0
Advanced Course. 3rd Year.	50 Lessons in Advanced Harmony and Musical Form ..	£2 10 0	£1 0 0
Special Class for Boys between 8 and 15 years of age—30 Lessons in Junior Solfeggio, £1.			

* Students who, on entering, can give satisfactory evidence of a knowledge of Solfeggio may be promoted at once into the Senior Solfeggio Class.

† Students above the age of sixteen are recommended to take up the study of Harmony in their first year as an extra subject, the Fee for which will be half that for the whole Senior Course.

PIANOFORTE, VOICE PRODUCTION, AND ORGAN DEPARTMENTS.

FEES FOR THE TERM OF ELEVEN WEEKS.

NUMBER OF LESSONS.	DAY CLASS.	NIGHT CLASS.
1 Lesson a Week..	£1 13 0	£1 2 0
2 Lessons a Week in One Department ..	£2 15 0	£1 15 9
3 Lessons a Week taken in different Departments	£4 2 6	£2 13 6

VIOLIN AND VIOLONCELLO DEPARTMENTS.

2 Lessons a Week in a String Instrument ..	£2 15 0	£1 10 0
2 Lessons a Week in a String Instrument, and 1 Lesson in Pianoforte or other Department	£4 2 6	£2 8 0

A Choral Class, to which advanced Students are admitted as Probationers, will be held during the months of November, December, January, and February .. .. Fee, 6/-

All teaching is given in classes. The solfeggio classes average an attendance of from twenty to thirty students. In harmony twenty is never exceeded. In the other departments three students as nearly as possible of the same force are taught together, each one getting twenty minutes individual teaching, and the benefit of listening for forty minutes to the instruction being given to others. The advantage of class teaching is as great in music as in other subjects. In the first place, there is the ordinary spirit of emulation induced; then the exchange of ideas that takes place when students meet one another is in itself a most valuable form of education, unfortunately almost wholly absent from the present mode of individual teaching. Besides, in music more than in any other subject, as performance is largely a matter of nerve, the habit of learning before others helps the student to be more at ease when called upon to perform; and errors and defects are often more apparent to the listener than to the person receiving instruction.

The annual examinations form a very important feature in the work of the school. At the close of the year a general review of all studies, by an examiner independent of the teaching staff, is an obvious advantage to all. Both the professors and the committee of management gain from the various hints and suggestions that an experienced musician

has it in his power to make, while the promotion of the students being placed in his hands obviates any injustice that might result from the natural or accidental bias of a teacher.

On two occasions Mr. W. A. Barrett, Mus. Bac., Oxon., Examiner to the Education Commissioners, Whitehall, visited Cork and inspected the school. Mr. Henry R. Eyers, of the Royal Academy of Music, London, examined for five consecutive years; and for the last three years the duty has been entrusted to Dr. Smith, one of the examiners to the Royal University of Ireland. The various reports furnished by these gentlemen are published in the annual reports of the school, and encourage the committee in believing that the work that has been undertaken is progressing in the right direction.

No prizes of any kind are given to the students, distinctions being honorary only.

The position of the professors amongst themselves is one of absolute equality. Each professor is supreme in his own department. The several departments, though they touch, do not overlap and are all equally subject to the control of the committee. The committee, in the absence of a professional principal, which under local conditions it was impossible to have, are obliged to undertake the duties of such a director to some extent; but in serious technical questions the action of the committee is regulated by the examiners' reports.

The departments of solfeggio, voice cultivation, and the choral class, which is an adjunct to the second year's solfeggio, are usually held by the same professor; but harmony, pianoforte, and violin departments are held by independent teachers. This is the most natural arrangement, but almost any combination or division of the departments is possible.

The average attendance since the school opened has been 175, but this present year 221 students have been registered. The fees paid, taking an average over the past five years, have been a little over £3 10s. per head, the total varying from £600 to £700 a year; and this sum has always been sufficient to pay the professors and to leave an average balance of £36 for the benefit of the school. All other charges—the rent and maintenance of premises, salary of resident lady superintendent, the cost of examinations, &c., have to be met by the local rate.

The Libraries and Museums Act gives a locality power to levy a tax not exceeding one penny in the pound for the purposes of the Act, which owing to the Amendment Act of 1877 includes music in Ireland as well as science and art. In Cork the net amount of the penny rate available

for our purposes realizes about £500 a year; of this sum, owing to heavy charges now existing for the Art School, music has had for some years but £100 a year as its share of the local rate; last year, however, by the aid of a public subscription, this sum was increased to £300. And over and above students' fees, £300 a year is barely sufficient to support the school; but to give scholarships, and to expand in other ways there should be at least an income of £500 a year.

In order to increase the income to this amount, an effort was made a couple of years ago to obtain State aid, feeling that the Institution had then existed sufficiently long to enable its results to be tested, and that the citizens of Cork had contributed to its support all that could reasonably be expected of them. A memorial to that effect was presented to the Chancellor of the Exchequer praying that the privileges afforded to schools of science and art of obtaining payment on results of local annual examinations might be extended to the science and art of music, and suggesting that, pending arrangements for carrying out such a scheme for the whole country, an annual grant might be made equivalent to the aggregate sum obtained for the support of the school locally, either from rates, public subscriptions, or otherwise, and setting forth both the legal and moral aspect of the claim as follows:—

I. That music is entitled, under "The Public Libraries (Ireland) Amendment Act of 1877," to be placed on an equal footing with science and art *in Ireland* only.

II. That instruction in music of an elementary character is already encouraged under the education code; that instruction of a more advanced character is given in the training colleges for teachers; and that the logical sequence would seem to suggest that encouragement to general instruction in music by means of annual examinations under the Science and Art Department, and payments on the results thereof should follow.

III. That the Cork School of Music is organised and conducted in a manner deserving of confidence. [See examiners' reports.]

IV. That a number of young people are admitted at a reduced scale of fees, in consideration of entering upon the study of music as a means of earning their bread as governesses, national school teachers, &c.

V. That many artizans, clerks, shop assistants, &c., of both sexes, obtain educational advantages, combined with opportunities of intellectual enjoyment, that

would not be accessible to them excepting through the instrumentality of such an institution.

VI. That thirty-three free scholarships have been placed at the disposal of the several religious denominations in the city, at the cost of the School, for the encouragement of poor children who have a talent for music.

To this memorial the Lords Commissioners of Her Majesty's Treasury sent a reply stating that they could not "entertain the question of a grant from public money in aid of a local music school." Their Lordships cannot candidly mean to plead that they are unaware of the State aid already given to instruction in music; nevertheless they certainly ignore not only the particular prayer of the memorial, but also the basis of fact upon which that prayer rests. The memorial sought to bring under notice no new principle of action in respect of State aid. The contention which the Lords of the Treasury avoid discussing is, that "Music" is a branch of "Science and Art" in so far as local rates are concerned; and although it has not yet been ranked with other branches of "Science and Art," instruction in which is encouraged by grants from imperial taxes, that it has, nevertheless, an equal right to be so ranked. The action of the Treasury in refusing to entertain the claim for aid is certainly not very encouraging to pioneers in educational matters, yet the legal right of music in Ireland to share the annual vote for purposes of science and art made by Parliament, and administered by the Department of Science and Art, South Kensington, is so clear that before long its justice must be acknowledged.

The general results of the experiment that has been conducted in Cork for now nearly eleven years—so long as almost to have passed the experimental stage—can be summed up in a few words.

In the first place, the examiners' reports to which I have referred show that the educational work is conducted on a sound basis, and the fact of an annual average attendance of from 180 to 200 young people of all classes of society, professional students and amateurs, paying about £700 a year for the education they receive, is sufficient evidence of the appreciation of the school by the people of Cork and its vicinity; and these figures prove that at the very moderate scale of fees charged, a school can be made to pay its way on a subsidy of £300 a year, in addition to students' fees, or to flourish on £500. Of course for the first year a larger sum would be needed for fitting and furnishing, purchase of instruments, arrangement of premises, &c. In Paisley one gentleman, the member for the borough, has for some years given an annual donation of a hundred pounds to stimulate

examinations in music, and there must be many other cities in the kingdom where no difficulty would be found in raising a sum sufficient to maintain a very effective school of music, without State aid or local rates.

But I mean to go further and to insist on the extension of the Irish Amendment Act to the rest of Great Britain, and the establishment of provincial or normal schools of music generally throughout the country, equally supported by the locality and by the State as a matter of both justice and necessity—justice to a noble art deeply pervading the life of the nation, and a necessary corollary to the present State contribution to musical education, for its due development, control, and organisation. The cost of one hundred such schools need not exceed a charge of more than £200 a year to each locality, and a general subsidy from the State of about £20,000 annually, with an addition of £5,000 a year to aid some of the existing Academies to give scholarships and conduct examinations. The total sum is not much in comparison with what is already spent by the nation on elementary instruction, and considering that at the present time £40,000 a year is spent in England and Wales alone in hearing little children sing a few songs learned by ear and sung in unison, the proposal need not startle the Treasury when we regard the far-reaching benefits that would accrue therefrom.

DISCUSSION.

Mr. Southgate.—I was unable to be here at the commencement of the paper, and therefore I cannot speak as to what our reader said in the first instance; still I have listened with a great deal of interest to this statement about the Cork School of Music, which would seem to be of distinct value as a factor in the art. But after all, have we not first to discuss the question whether such a school or series of schools should be permitted? I am sure we all rejoice to know that music is being more widely disseminated, and we are quite certain that with that dissemination there must come a certain amount of pleasure to the people who sing and listen to music; but I am not quite prepared to say that this ought to be done at the expense of the general community. It is quite true at present a large sum of money is voted to the Government for the encouragement of music. With one portion of that payment I totally disagree. I have expressed that feeling in this room before, and I daresay I shall again object to the very large sum which is annually voted for singing by ear. I feel that it is impossible to

defend that portion of the "music grant." After all that may be said in its defence, singing by ear is merely an example of the laziness of teachers, or of their incompetence. It would be idle to pretend that they cannot master in a short time and without any difficulty sufficient knowledge of music to teach such an elementary notion of it as would be sufficient for their schools. If they do not choose to do so, and merely rely on the fact that their scholars, who may, perhaps, have quick ears, have picked up a few tunes, and for that are content to receive a small sum, whereas if they sang from notes they would obtain double the sum, all I can say is that we ought to be very much ashamed of the teachers. I think this is a matter for the musical profession to condemn in the strongest possible way. With that exception we are all glad to see this grant; we know that it does encourage the teaching of music in schools, and has had a considerable effect on the pupils in making them love the art and practise it. But if we proceed further than that, it seems to me there is some difficulty in determining where you are going to stop. Suppose that schools of the character we have heard of are founded in various centres, and proper instruction is given by competent men, where are you going to draw the line as to free tuition? Besides singing, would you have them taught various instruments, wind and string? By parity of reasoning, I can see no cause why you should not! But if you do that, are you not coming seriously into competition with the profession itself? I cannot help thinking that our ranks are overcrowded, and it is not very easy for all teachers to find something to do; if they are to compete against institutions subsidised by the ratepayers' money you will throw on the unfortunate profession further and fresh difficulties. If you find scholars in the lower ranks of life who have been educated at the public expense, and who show any distinct musical gifts, one would like to see some plan by which they could be admitted to higher tuition, and pursue a proper course of study. Doubtless they would do that with benefit to themselves and with the probability of after benefit to the community at large. But to take a vast number of children and give them the privilege of entrance into schools where they would be taught for nothing, or for very small fees, is to encourage them to compete against others whose parents have to pay for them. This is, I think, unjust. With regard to the Cork School, I should like to ask whether there is any visible outcome of the teaching which goes on there. Are any performances given? or have we nothing more than the mere reports of the examiners as to their having mastered their lessons properly? If not, I should think schools of that description fail in their primary object—namely, not only to allow people to acquire a know-

ledge of music, but also to have a practical acquaintance with it, and to be able to perform music. It is all very well to go on listening to lectures on music; I am afraid that is part of the weakness of our University teaching—lectures are given on music, but no practical teaching takes place. After all, the art of music is not one to be dissected academically in the lecture room; we ought to have some practical outcome from it. I would like to ask Mr. Hill whether any practical results in the way of the performance of music have flowed from the novel system introduced in this school.

Mr. HOPPER.—I heartily concur with Mr. Southgate's remarks. I was some five or six years ago, for a short time, in a town where there was a musical school, and I was obliged to leave it. In the East End when pupils come to me and ask my terms they say: "Oh, I can go to the People's Palace and learn much cheaper." It is ruining the profession. I do not say it is wrong, but I think we are bound to hear both sides. The profession in London is done for, in fact, by these schools being opened here.

Mr. WALTER WESCHÉ.—We seem disposed to make rather light of singing by ear, but a few years ago I had some experience in a school where it was found impossible to teach the children in any other way (except by the Tonic Sol-fa) on account of the expense of the music. With 120 children it was found very expensive to have copies of short part-songs, or even to buy a set of solfeggi for them, and everything had to be done on the blackboard. It was utterly impossible to arrange every time something fresh, and it was also rather difficult for 120 children to see one blackboard, so we were obliged to manage things by ear. I think this is the great objection in all the Board Schools to the Old Notation, and is why they use the Tonic Sol-fa so much. I daresay some of you have seen that method by which the teachers have what is called the Modulator, when they make the children sing by means of the pointer. There the whole matter is simple enough: if one pointer does for a class of sixty, and another for another class, the difficulty of expense is removed. That is the reason why singing by the Old Notation is not encouraged, because they find the expense too great.

The CHAIRMAN —The Tonic Sol-fa is used to a very great extent.

Mr. WESCHÉ.—In the immense majority of cases.

Miss OLIVERIA PRESCOTT.—One thought I have in my mind is that the comparison with Science and Art Schools is a little bit disputable, because those schools do not teach the same art as is shown in the Royal Academy. In a music school of this sort you would have to teach the same music as is taught in the Royal Academy of Music and other

institutions of that class. The Science and Art Schools teach a very much more mechanical kind of art: they teach drawing that is useful to carpenters and designers, and decorative art; but I think you cannot draw a distinction in music between the two kinds of music. Thus it would be that a musical school conducted on the same lines as the Science and Art Schools would compete with the ordinary profession, which the drawing schools do not.

Mr. Southgate.—I must say that I have heard the statement made by Mr. Wesché—that one reason why the Old Notation is not employed in schools is because music published in it is so expensive—with a great deal of astonishment! Music is so cheap now—so terribly cheap, I was going to say—for you can buy an enormous quantity for a shilling—that it reflects seriously on the management of the Board Schools to defend the practice of singing by ear on the ground of the expense of supplying music in ordinary notation. If I remember rightly, Novello's publish a little book of School Rounds of about 100 for 6d. But independent of that, music on the five lines and spaces can be taught by your hand and nothing else. I have lately had occasion to go into the question of the notation of music, and have had in my hand Guido's "De Artis Musicæ," a volume in the British Museum nearly 1,000 years old; there he gives directions for choir training which are most admirable, and are quite applicable to the present day. He wrote sometimes in pneumes, sometimes in alphabetical notation, and he used two lines, the others had to be guessed; but he also used the hand. There we have the five lines and spaces, and you can indicate any note you choose without any written music or expense. If from that ancient natural stave the pupil can sing the scale up and down, and dodge from one note to the other, when music is put before him he will not give a bad account of it. Moreover, with a large blackboard you can do a great deal. In all my class and church practice work I have used a large blackboard with two or three staves, on which could be written two and three-part songs. I found this arrangement ample for teaching purposes, so that I think the expense of music is rather a poor argument in defending ear-singing. No doubt it comes from school teachers or managers rather than from our friend here.

Mr. Wesché.—It comes from the managers, no doubt. It was not exactly a Board School that I referred to, but the same principle applies. It is all very well to teach with the hand: Hullah gives that illustration. I may have had to do with very foolish pupils, and my experience is not to be compared with Mr. Southgate's; but I think it would take me a long time to learn to sing at sight by the use of anybody's hand alone; 120 children could not see it very well,

and could not go up and down the scale from one person's hand.

Mr. Baker.—Does Mr. Hill's Cork School damage the professors? I understood that they were paid out of the scholars' fees.

Mr. Hopper.—Not the whole of the professors in the town, only a few are taken out of the town. The resident men and the others may go. They cannot find employment in the school for all the professors, and the fees are lower of the two.

Mr. Hill.—The advantage is in favour of the professors, because a number of people come to learn at the School of Music who would not learn otherwise, and, therefore, we are increasing the field.

Mr. Hopper.—I am afraid a great many professors have to leave.

Mr. Hill.—Our experience is that it brings people to the school who otherwise would not learn, and as all the money we get from the public goes into the professors' pockets I believe it is an advantage to them.

Mr. Hopper.—How are the professors appointed?

Mr. Hill.—In the first instance, when starting, we took local men, and were very fortunate in those we got. From death and resignation the staff has changed, so that at present there is not one of the original professors remaining. We have two local men, but the other professors we had to bring into Cork. There was no specialist for teaching singing when our professor died.

Mr. Hopper.—Then you injured no one by bringing in a fresh man; but supposing you had a singing master in the town, you would injure him.

Mr. Hill.—We should certainly work with the tools we had. Where local men exist able to do the work they should get the preference.

Mr. Southgate.—As to the performances?

Mr. Hill.—As to the performances, our difficulties are rather to keep the students back; they want to perform a little too much.

Mr. Southgate.—That is a common fault.

Mr. Hill.—We do not encourage concerts, although we are obliged to give them, because the parents like to hear their children; but we have only one or two in the season. There is one choral concert in the year which the students look forward to very eagerly, for after working through the dry solfeggio work for two years it is a matter of enjoyment to join in a choral performance. That is made the principal concert of the year. We have given occasionally one or two recitals in which there are solo performances, in which piano and singing were the chief features; but we find that

the students want to be taught to work before they come to perform. The difficulty really is in keeping them back.

Mr. Southgate.—Are there any choral societies there in which children who are students eventually enter?

Mr. Hill.—We started with the idea of making use of the choral society which then existed, and drafting students into that society after they had been trained; but the society broke down, as a great many amateur societies do, before we had an opportunity of utilizing it. Last year a society was started, to some extent an emanation from the school, though not connected with it, and one of the rules is that after the first year no one could be admitted to the choir except those who have passed the solfeggi examination in the School of Music; so that the School of Music in teaching young people to read at sight is an advantage to societies of the kind as well as to church choirs. There are a great many students of the school in church choirs. One student passed with very great credit two years ago into the Academy in Berlin, some of our students have entered the R.A.M., one young lady, I believe, is teaching music in France, and two or three are teaching in England as governesses, so that we have done some work. But ten years is a short time, after all, to show any considerable results.

The Chairman.—If there is nothing more to be said I can only say that we have really had a very good discussion, and one of a practical character. Whatever may be the differences of opinion on the various points we have heard to-night, it seems to me the question is one very well worth looking into more carefully at a future time when we have the paper before us in print. With regard to elementary teaching throughout the country, certainly we all wish that the very considerable expenditure which is laid out by the Government for that purpose should be thoroughly and efficiently applied. It has more than once appeared to me that it is not, and that a great deal of the money has rather been wasted. We ought to look at it not merely from the ratepayers' point of view, but to take care, for the interests of music and art, that the money is laid out in a way which is beneficial to the interests of those who study at these schools, and come under the influence of the teaching there. Mr. Hill has alluded to one or two points which are to his mind of paramount importance: one, that there should be a proper system, and also that the teaching ought to be thoroughly efficient. Those are the two great points to be attended to, so that the divine art may be brought home to the whole people, and England become a really musical nation.

The vote of thanks to Mr. Hill was then carried unanimously.

JUNE 3, 1889.

CHARLES E. STEPHENS, Esq.,

IN THE CHAIR.

NOTES ON THE ACTION OF MUSICAL REEDS.

BY D. J. BLAIKLEY.

THE members of this Association, since its foundation, have been again and again both delighted and instructed by discourses on subjects connected with the art and the history of music. Those of us who have ventured to speak on any scientific point have doubtless considered that as the Association was formed for the investigation and discussion of subjects connected not only with the art and history, but also with the science of music, the framers of its constitution had in view a certain object in admitting science. This object I take to be the wholesomeness and desirability of an occasional descent from the realms of art and imagination, and even of a turning aside now and again from the more human and sympathetic interest called up by the study of the history of musicians and their works. I am encouraged to think that this province, the science of music, may be taken to include not only the study of the laws of the art as deduced from our mental perceptions, but also the examination of all those mechanical actions by which music, the conception and thought of one man, becomes a reality to listening thousands.

The particular branch of musical mechanics which I now

put forward for your consideration is "the Action of Musical Reeds." Reeds form, as a class, a source of sound which is exceedingly widespread both historically and geographically. It would be vain to attempt to fix the time when they came into use; indeed, a moment's examination of certain patterns in use to this day will convince us that the savage need hardly have waited even for the split flint; good sound teeth and a thumb-nail of, perhaps, pre-historic strength, would probably suffice for their manufacture.

Examples.—The "drone" reed of the Highland bag-pipe was shown in contrast with the delicately finished reed of the oboe.

Reeds, mechanically considered, must be regarded as the most important sub-division of the general class of vibrating bars used for music. This class comprehends struck bars, either with resonators, as tuning-forks on their boxes, or without, as the bars of the harmonica and the glockenspiel; and also the bars, plates, or laminæ called reeds, which are put into vibration, not by a blow from a hammer, but by means of a current of air. The essential distinction between the reed and other musical bars is not its greater flexibility, but the manner in which its motion is originated and maintained. For instance, the reed of a Dobell's fog-horn is a blade of steel quite as stiff as many tuning-forks, and much stiffer than the bars of a glass harmonica, and yet it is as truly a reed in its action as the most delicate reed of the clarinet.

Although the manner of reed action has been the subject of much mathematical investigation and demonstration, yet the references to it in books intended for general readers are, to my thinking, for the most part somewhat vague and unsatisfactory. A very slight examination soon convinces us that such a phrase as "vibration caused by the pressure of the air" does not convey much information; the question presented for solution is, "How does the pressure of the air cause continuous vibration?"

A few years ago this question was discussed by Mr. Hermann Smith in a series of articles called "In the Organ and the Orchestra." Although I cannot accept all his conclusions, and believe some of them to be at variance both with theory and experiment, yet in many points I am not merely in agreement with him, but must acknowledge my indebtedness to his treatment of the subject.

Perhaps the most convenient way to illustrate reed action is to take a thin lath or strip of wood supported at one end, and subject it to pressure in various ways. Suppose we apply a weight gradually and without jerk; we find that the position of equilibrium is changed, but there is no other result. Again, let us place the weight on the lath and

remove the hands suddenly; this corresponds to a sudden pressure of wind brought to bear upon a reed. The lath under this influence is carried beyond the position of equilibrium, recovers itself by virtue of its elasticity, and vibrates for a short time; but the force applied is soon dissipated in internal molecular friction, &c., and the position ultimately taken up is the same as in the first case. In this position of rest, there is on the one side the greater static weight or air pressure, and on the other the lesser weight or air pressure plus the elasticity of the reed; these forces balance, and vibration is at an end. Hence we arrive at the following deductions—

(1.) A static pressure produces deflection only.

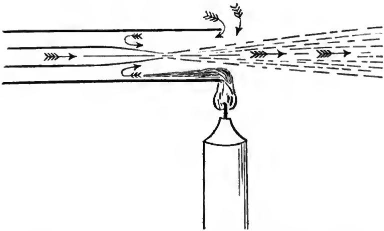
(2.) A sudden impulse or dynamic pressure can originate vibration, but cannot maintain it.

As examples of such suddenly applied impulses, we may note the plucking or striking of a string or a tuning-fork, in which cases we get vibrations which are evanescent in character, and not, strictly speaking, continuous. In order that vibration may be continuous there must be something more than a mere difference of pressure on the two sides of the reed, whether that difference is applied gradually or suddenly; there must be an application of force of the character of a series of pushes or pulls upon the reed so timed with respect to its oscillations as to replace the energy dissipated by its own friction, &c.

A recurring increase or decrease of pressure upon the reed at a certain part of its course provides that which is requisite, and to understand the nature of that variation we must bear in mind the power possessed by a jet, sheet, or column of air in motion, to induce currents in the air contiguous to itself.

As an illustration of such action I have sketched on the black-board a common gas-forge or blow-pipe such as is used by metal-workers of various kinds. When this apparatus is in ordinary use coal gas is supplied through the outer tube, and this is intimately mixed with air forced through the inner tube, which terminates in a small orifice. We may disregard the gas altogether and examine the action of the air-jet, when no gas is turned on. On first consideration, it might be supposed that the jet of air would pass through the surrounding air either without exercising much influence upon it, or that the influence, if any, would be a compression of the air in the neighbourhood of the compressed jet. You will notice, however, that when a lighted candle is held near such a jet, the flame is sucked into the outer tube, showing that the air issuing from the small nozzle carries with it some of the air immediately around it, and thereby causes a rarefaction of the air in the large tube. The outer air rushes in in a direc-

tion contrary to the issuing jet to restore the balance, and carries the flame of the candle with it.



This action of air as applied to reeds appears to be somewhat as follows:—In whatever way the motion of a reed is started, say, as by blowing through a harmonium reed, directly air passes through, it carries with it some of the air on the inner side of the reed, thereby causing a partial vacuum or diminished pressure, and producing the required pull upon the reed; the partial closing of the reed gives the opportunity for the air to recover its normal condition, or at least to approximate towards it, and thus a force of intermittent action is set up sufficient to compensate for the loss of energy otherwise taking place.

This action may vary between a gentle undulation and a discontinuity so great as to give a succession of shocks, and consequently a very complicated wave form, or, in other words, very strong partials, although the motion of the reed itself may be simple harmonic. It is not peculiar to reeds, but it is to be observed when any solid body passes rapidly through the air, or when air passes rapidly by any solid body. The crack of a whip, the whiz of a rifle bullet, and many such noises are due to discontinuous induced currents, causing pulsating or vibratory action, and hence sound. The vibration manifestly does not originate in the bullet, but in the air surrounding it. The office of reeds is to aid, modify, and strengthen this effect; to bring this action, in short, under complete control, so that it may be applied to artistic purposes. In some cases it is possible that reeds act rather by regulating the size of orifice through which an air-jet passes than by any vibrating action of their own.

If we leave out of consideration the natural reeds, the

vocal chords of the larynx, and the lips as used with brass instruments, we find that metal and elastic cane are the two materials altogether, or chiefly used for reeds—metal for those instruments in which one note only is required from each reed, and cane for those instruments in which the reed has to serve for a wide range of notes.

CLASSIFICATION OF REEDS.

METAL	STRIKING (limited range of vibration).	Old Regal Organ (usually)
	FREE (unlimited range of vibration).	Harmonium—Concertina Organ (rarely)

		ENCLOSED.	OPEN TO THE LIPS.
CANE	Single (striking)	Bag-pipe drone	Clarinet Saxophone
	Double ...	Bag-pipe chanter Cromorne ...	Oboe Bassoon

In making use of the customary distinction between striking and free reeds, I do so without joining in the opinion which some hold that there is any essential difference between them in their action. I believe the difference to be rather one of degree, for it is not necessary for speech that the so-called "striking" reed should really strike its case.

In practical music reeds are always associated with resonating cavities or tubes: those in the harmonium and concertina are usually smaller than requisite to give the maximum resonance to the prime tone of the reed, and therefore one or more of the partials coinciding with the proper tones of the cavity are proportionately more strongly reinforced than the prime. It is partly by differences in the reeds themselves and partly by varying the proportions of the resonating cavities that differences of quality are obtained in instruments of the harmonium class.

In reed pipes as used in the organ, the reed and resonating tube speak one note only, whereas in orchestral instruments the reed has to accommodate itself to many different lengths of tube, and in this lies the great distinction between the two classes of reed pipes. Further, in wood-wind instruments, not only the lowest proper tone of each particular length of pipe is used, but the upper proper tones, the octave, twelfth, and double octave.

The two questions which have given rise to most discussion in connection with reed pipes are, I think, the following:—

(I.) Does the order of the proper tones, or harmonics, depend upon the reed being striking or free, single or double, or upon the form of the tube?

(II.) Does the pipe control the pitch of the reed, or the reed that of the pipe?

When a tube is blown by a reed, the orifice between the two blades of the reed, or between the reed and the mouthpiece is so small, that as regards resonance the tube behaves as if it were closed at one end: the proper tones of such tubes, cylindrical and conical, are as follows:—

PROPER TONES OF TUBES CLOSED AT ONE END.

Harmonic series	1	2	3	4	5	6	7,	&c.
Cylindrical	c	—	g′	—	e″	—	b♭″	
Conical	c	c′	g′	c″	e″	g″	b♭″	

I now take a cylindrical tube twenty-two inches long, giving as its lowest tone when closed by the lips and blown the note D, corresponding to the low E of the B♭ clarinet; the next possible note is the twelfth from D—viz., violin A; trying the tube in this way, and also with a clarinet mouthpiece and a bassoon reed, we find that the notes obtainable are the same in every case. We thus find, in the first place, that the pitch agrees with the calculated pitch of a closed pipe of that length, and secondly, that the change of reed, from single (clarinet) to double (bassoon) produces no change of effect. The great difference in length of tube for a given note on the clarinet and on the bassoon is not due to the difference between the reeds, but to the fact that conical tubes are twice the length of stopped cylindrical tubes for any given fundamental note. I have chosen this simple cylindrical tube for the purpose of illustration, but in practice the slight bell of the clarinet gives some small resonance to the upper even partials. When the reed is very strong, we can in some cases throw the air into forced vibrations apparently at variance with the law of resonance above given.

As regards the control over the pitch exerted by the reed upon the pipe, or *vice versâ*, in no case is it absolute on one side or the other, but it is mutual, and the extent of it depends chiefly upon the relative mass or strength of the reed and the air-column. A stiff reed has a great power over the pitch of a comparatively light air-column, and can constrain it to its own; on the other hand, a comparatively large mass of air has great power in controlling the pitch of a light reed. When the proper tones or natural rates of vibration of the reed and of the air-column are in agree-

ment, the maximum volume of tone is produced; as these diverge, the pitch changes, the loudness decreases, and in some cases silence takes place. The cane reeds of wood instruments are very light; in these instruments the air-column is the chief factor in determining the pitch, but in some degree the vibrating length or weight of reed can be adjusted by the lips to the note required.

The mutual influence between reed and pipe can be well examined by taking a comparatively light metal reed, and associating it with a pipe. I have here a small carefully weighted bellows, and in connection with it two harmonium reeds of about 1,024 vibrations. One of these reeds is connected with a very small resonance chamber, and the other is so arranged that tubes of different lengths can be added to it. You will now notice that as the tuning slide of the reed-pipe is extended the pitch becomes slightly flatter only; the pitch of the reed by itself would remain constant, but the pipe has some controlling influence. When the tube is extended to a certain length all sound ceases, and it is natural to suppose that the reed is over-weighted by the air-column, and so can no longer set it in vibration. This, however, is not the case, for if I continue to add to the length of the tube, the reed speaks again. The length now added, reckoned from the middle point in the region of silence, is equal to a quarter wave; there is now the possibility of the formation of a node in the requisite position, and thus speech of the reed is obtained. Instead of a quarter wave, we may add, as I now do, a three-quarter, or a one and a quarter wave length of tube, and the reed still speaks freely. On the other hand, if we add a half, a whole, or a one and a half wave length of tube, silence is maintained; making up the last of these, however, from one and a half to one and three-quarters wave length, we again have the reed sounding clearly. In every instance silence depends not upon the actual weight of the air column, but upon the approximate correspondence in position of the open end of the tube with the position required for the formation of a node in the stationary sound wave.

If, instead of changing the weight of the air column by altering its length, we do so by altering its density, the same effects take place; a rise of temperature, or admission of a lighter gas than air, raises the pitch, or even changes silence into speech; every change of temperature or density therefore influences both the pitch and the fulness of tone of a reed-pipe.

It will be at once seen that the few remarks and the rough experiments I have brought forward touch but the fringe of this interesting subject. It naturally opens out in one direction towards some of the most important considerations

in mechanical science—viz., those connected with the effect of the wind upon engineering constructions; and in the other, to the examination of the most wonderful of all reed instruments —*i.e.*, the human voice. With regard to the first of these, it is well-known to you all that although the pressure of wind, as in pounds per square foot, can be tolerably well measured, its actual effect may be very different from that due to its nominal pressure. A great bridge or tall chimney may behave just as a reed does: given certain conditions, and the sole effect will be a slight bending under the blast; change the conditions slightly, not necessarily by increasing the pressure of the wind, and a violent vibration may be set up, possibly ending in a catastrophe. In our experiments with the reed and resonating tube, the pressure of the wind was the same when the reed was merely deflected without speaking as when it was vibrating powerfully, and consequently speaking loudly.

With regard to the voice, although we require to be very cautious in reasoning from rude mechanical devices to a more complex condition of things, yet I think such experiments are suggestive, and if not strained in their application, distinctly useful. When a reed is of one pitch and its resonator of another, greater effort is requisite to produce a certain effect than when both are in sympathy. This state of things may occur in vocal action; also, the tension of a reed, or of double reeds such as the vocal chords, may remain constant throughout the delivery of a sustained note, and yet the note itself may be gradually flattening through alterations in the cavity of the mouth. Many other points will occur to you; if the few I have touched upon suggest any useful ideas, I hope these will be some compensation to you for the tediousness of listening to the somewhat disconnected notes and experiments now brought forward.

DISCUSSION.

The Chairman.—Ladies and gentlemen, our first duty is to pass a vote of thanks to Mr. Blaikley for the great research he has undertaken in order to present these interesting details before us. The subject is one on which I suppose there are not many present who will be able to say much, but still I hope we shall hear some valuable remarks after passing a vote of thanks to Mr. Blaikley. [The vote was passed unanimously.]

Mr. Hopper.—I did not quite catch why the clarinet gave different harmonics to other instruments.

Mr. Southgate.—I should like to ask Mr. Blaikley one or two questions. His subject is one which, unless it is studied to some extent, one is hardly able to express an opinion of any value upon, but I think we should all be glad of further information on certain points. I would ask Mr. Blaikley first, whether in his experience there is any difference of tone, timbre, or klang-tint in the sound derived from different reeds; whether the material of the reed, be it steel, brass, or cane, has any influence on the tone itself. I would also ask whether the modification of tone which we get when reeds are inserted in the pipe has anything to do with the material; that is to say, whether the shape of the pipe is the sole cause of the tone being modified, or whether it is in any way attributable to the material of which the tube is made. One more question with regard to the old regal. I think there are only two or three specimens in England, and I have never been fortunate enough to see the inside of one. I have seen several abroad, but not the inside. If I remember rightly, in the Germanic Museum at Nuremberg there are some half-dozen instruments there. I once looked at these with a great deal of interest, because, of course, they are the parents of the harmonium, and were no doubt used largely in old times. I was exceedingly anxious to look into one of these ancient instruments to see the material of which the reed was composed, and also how it was placed, but I was not permitted to do so. The guardian of the room pointed to the very strict regulations that were in force, and although one had only to undo two little hooks, and to raise up the frame, he told me it could not be allowed, and I think referred me to Berlin for permission. However, life was too short to refer to the German capital, where probably a Cabinet Council would have had to be held to determine whether one could see the interior of these instruments, so I remained in my ignorance. I should like to ask, therefore,

what is the material of the reeds in these instruments, and their position; if they are placed in pipes, how it is that from a small length of pipe we get notes of very different pitch? I ask this, because Mr. Blaikley has shown by these experiments that the length of pipe does to a certain extent alter not only the quality of the tone, but the note itself.

Mr. BLAIKLEY.—Perhaps as this subject has been raised I may supplement my paper by a little description in detail of the regal. I was more fortunate than Mr. Southgate; I was in Leipsic ten days ago, and happily I had not to go on to Berlin to get permission to see one. I had the good fortune to see a very fine collection of instruments at Leipsic, collected by Herr Paul de Wit, and among them a regal which he kindly took to pieces for me, or at least took two or three keys and their action-work apart to show me the construction exactly, of which I will make a rough sketch on the board.

RESONANCE CHAMBER OF THE REGAL.
A A A Openings. R Reed. T Reed tube.

The resonance chambers are about the same size as in the harmonium for the same notes; there is no large aperture covered by a pallet, but simply a few small holes about $\frac{1}{8}$th or $\frac{1}{10}$th of an inch in diameter; at the other end of the resonance chamber is inserted a small reed tube or shallot, carrying a striking reed, which strikes against the face of the reed tube much in the same way as the clarinet reed against its mouthpiece; I think the reed is of brass. The pitch of the cavity was doubtless higher than the pitch of the reed, and the tone instead of being very harsh was modified by the exit being simply a few small holes instead of a large opening.

Mr. HERMANN SMITH.—As regards the regal, there was an old organ in the Exhibition at South Kensington which had a reed very similar to that. The pipes were open at the top, not closed with the pallet; the wind was admitted at the bottom in the same way as in the organ. I think in all these regals we have a variation between the harmonium and the organ; it is neither the one nor the other; for the harmonium is the more complete development of that particular class of reed which is called the free reed. The character of the reed tone appears to be much the same, and the real modification of the tone comes in all cases from the

tube itself, or, I should say, from the degree of occlusion of the tube. That, in fact, is the main feature of a harmonium, and all instruments of that class—the degree of occlusion, of the orifices of the chambers or the cavities in which the reeds speak. You may cause reeds to speak from all sizes of tubes and cavities so long as you vary the degree of occlusion. The actual length really determines very little. You can always find that particular relation of occlusion which will suit the reed, whether it is large or small; but with the very smallest you cannot unless you go to a greater extreme, that is to say, sometimes the mere one-eighth of an inch thickness of wood beyond the reed will suffice to produce silence, and you may add to that thickness little by little until you come to the point when the reed will speak. So it is in going up to a larger size, you may cause the smallest reed to speak into a very large cavity, because it is not influenced by it in pitch; and with the larger reeds—those which we consider the lower half of the instrument—there really seems to be no limit to the character and shape of the cavity you may use. It all depends on how you modify the approaches and the openings; you may have more than one opening with very great advantage; I have made an instrument which represents the clarinet in tone, and which my friend Mr. Southgate has heard. Every note of that instrument is made with the same size of box, the shape of a quarter of a circle, which was originally a little trinket box of Japanese make, of three and a quarter inches radius, and one and three-quarters in depth, having a little drawer swung on a hinge. I bought a gross of these, and determined to make an instrument of them, and from the lowest note to the highest that same sized box is used. The only difference is in the presentation of the impact plates, as I call them, in the face of the reeds and the openings. In most cases I have two openings, so that in free reeds one has no occasion to count upon length of the tube, because you obtain the necessary relation for due speech simply by the degree of occlusion. You may by presenting a little impact plate $\frac{1}{32}$nd of an inch nearer or farther cause speech or silence; the least fraction will do it. You obtain in this case a very beautiful tone just as you get out of the region of silence. The quality of tone that can be obtained entirely depends on the question of degree of occlusion. The instrument has $3\frac{1}{2}$ octaves.

Mr. Southgate.—I am very glad to bear testimony to the success of Mr. Smith's experiment (I think I may call it) with the free reed. He, by means of what he has described as impact plates, modified the quality of the instrument so much that I must say had I been in another room I do not think I should have known it from the true clarinet, it was

so very much like it. In conjunction with Mr. Smith's device, we may remember that Mr. Evans, in his little instrument, the *Orchestrina di Camera*, obtained some very successful results with free reeds. The most successful instruments, so far as my memory serves me, were the oboe, bassoon, and clarinet; I thought the others were not so good. The tone of each of those instruments was marvellously like the original, indeed it was very difficult to say they were not the ordinary orchestral instruments. How that was done I am not quite clear, but I do remember this, that he told me the principle was not in the setting of the reed in vibration, but in the shape of the cavity which received the sound after it came to the reed, and then the way in which it was allowed to escape. From the very same reed he got the oboe, clarinet, and bassoon tone, which you know is very different. Of course the oboe and bassoon belong to the same family, but although he used similar reeds the shape of the "pans" differed, and so he got tones marvellously like the respective orchestral instruments. There is, I believe, to an intelligent and persevering experimentalist, a great future for the free reed.

Mr. Wesché.—With regard to the tone of reeds in the harmonium, it depends, I believe to a great extent, on the thickness, and matters like that. The principle of Mr. Baillie Hamilton's Vocalion is practically an adaptation of the harmonium reed. The theory is that each resonance chamber (which was supposed to represent the resonance chamber of the voice) had the same relation to the note as the cavity of the throat to the note you sing.

Mr. Hermann Smith.—It is true that instruments of large design, using free reeds, broad channels and chambers, and actuated by pressure of wind, whatever the mechanical arrangements, are virtually harmoniums, though we do not generally like to acknowledge it. Some fourteen years ago I originally planned the type of such instruments, worked them out in diverse ways, with cups and cavities, and broad reeds of many peculiar devices, striving during many years of experiment to develop the musical capabilities of the free reed. Broadly speaking, such work is simply the carrying out of the system of larger chambers for each note than we give in the harmonium. For instance, there would be perhaps a cavity of nine inches long by three inches broad, whereas, in the harmonium you do not get above three-quarters of an inch by four inches. The whole system depends upon giving a sufficient body of air to afford resonance of tone, and of course the working out of all these things depends upon a certain system. Usually the voicing of the reed is of importance. But in the little instrument I was telling you of I did not voice the reeds at all. I simply made the modifi-

cation from the bare harmonium reed tone, by the relation of the cavity and the partial occlusion. The voicing of the reeds seems entirely to depend upon giving the reed a particular kind of curve or bend in a portion of its length, the effect of which, I take to be, is that the reed is thereby better able to resist its tendency to swerve in that lateral quivering which is prejudicial to the character of tone. You give a bend—a twisted bend—to it (in fact, you cannot get that bend out when you have once given it), and it is that which really stiffens the rectangular reed, which is of an undue length, and prevents its quivering in vibration under the varying stress of the wind. When the wind attacks, it attacks sometimes one side of the reed and sometimes the other, and tends to bend and compress the reed on the side to the right or left; then the reed has to recover itself, and there is a want of smoothness in consequence. The only remedy, instead of relying upon voicing, is to have a broader reed. You may have reeds, three, four, or five inches broad. When you get a broad reed then there is a certainty in the movement which the narrower reeds never have. For instance, in a harmonium when we have a narrow reed there is always an oboe tone; if we want a clarinet or flute tone we choose a broad and short reed. Evidently the characteristic of the tone depends on giving the reed that evenness of motion under the varying stress of the air which you cannot get when you have the reeds long. In fact, as soon as the reed dips below the frame it is, as it were, subject to a twist, according to the way in which the air draws off from it.

Mr. Blaikley.—With respect to the question which was asked first by Mr. Hopper, the natural order of succession of the clarinet tones is this—one, three, five, seven, nine, &c., like a stopped pipe exactly. The clarinet, the oboe, and bassoon all give the tones proper to pipes of their respective forms and dimensions. The clarinet gives the tones proper to a closed cylindrical pipe, the oboe and bassoon give the tones proper to a closed conical pipe. The difference lies in the distinction between the cone and cylinder. If you change the reeds, as from single to double, between two instruments, and treat them under similar conditions, you would maintain the characteristic series of harmonics proper to each instrument. That is a point that has been disputed, and a different view was brought forward in a paper read here through Dr. Crow a few years ago, which view I ventured to dispute. I have many times endeavoured to find myself in error on this point since then, and have not been able to do so. That is all I can say as to my own experience. As regards the material of reeds, the material has a vast influence, there is no question about that; as to

what sort of tone we should get with a metal clarinet reed I cannot say, the thing is rather difficult to work out. I did once try to make an oboe reed of silver, and succeeded to a certain extent; but it was necessary to get the reed down so thin that it would hardly bear handling, it was so delicate. That the material or quality has an immense effect you may judge by this—that two cane reeds between which, by measurement, sight, or any other such test, you can distinguish no difference whatever, may yet differ very considerably in tone under the operations of a good player. A good player will detect at once by sounding a reed that there is a difference between it and another, and although you cannot detect it by sight or measurement, yet not only the player but the listener will detect it when the reed speaks. As there is this difference between different samples of cane, there is a greater difference without doubt between cane and any other material. As regards the various materials of pipes, I would not like to say that there is absolutely no difference in tone due to material, but practically it is exceedingly slight. I have had some practice in testing and hearing tested clarinets in ebonite, cocus wood, and African black wood, which are the three materials most used, and I cannot find amongst those who can really judge that there is any consensus of opinion. One man may say he prefers that or this, but to find two men give exactly the same opinion I have not been able. I think, therefore, the difference is so slight that it may be neglected. I would just like to correct myself with regard to the regal. I am not sure whether the resonance chamber is closed with a pallet or not; I think not, but that the air was admitted in the way stated by Mr. Smith. The instrument was one of the early part of the seventeenth century. With regard to Mr. Smith's remarks as to occlusion, I distinctly agree with him. The thing is manifested there thoroughly.

Mr. Southgate.—There, from a different quality, you produce different partial tones.

Mr. Blaikley.—You can modify the resonance, strengthening certain partials, and relatively weakening others by altering the position of the holes in the chamber, or its size and proportions. With regard to the question of the voicing of reeds, I am sorry I cannot give much answer, and I cannot add to Mr. Smith's remarks. With regard to the sensitiveness of a reed to any slight variations in the conditions under which it speaks, I can state with great certainty that a difference between the levels of the two cheeks or sides bounding the aperture of the clarinet mouthpiece that can hardly be detected by measurement, will, by throwing a twist upon the reed in closing, upset the quality. I have only to thank you for the kindness with which you have received my paper and remarks.

PROCEEDINGS

OF THE

MUSICAL ASSOCIATION

FOR THE INVESTIGATION AND
DISCUSSION OF SUBJECTS CONNECTED WITH THE
ART AND SCIENCE OF MUSIC.

FOUNDED MAY 29, 1874.

SIXTEENTH SESSION, 1889-90.

LONDON:
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CONTENTS.

RULES AND REGULATIONS

Passed at Five Special General Meetings of the Members, held at 27, Harley Street, W., on February 7 and April 3, 1876, on January 6, 1879, on December 6, 1886, and on June 2, 1890.

OBJECTS AND CONSTITUTION.

THIS Association is called the "MUSICAL ASSOCIATION" and is formed for the investigation and discussion of subjects connected with the Art, Science, and History of Music; and is intended to be similar in its organisation to existing Learned Societies.

It is not intended that the Association shall give concerts, or undertake any publications other than those of their own Proceedings, or the Papers read at their Meetings.

MEMBERS.

The Association shall consist of practical and theoretical musicians, as well as those whose researches have been directed to the science of acoustics, the history of the art, or other kindred subjects.

Any person desirous of being admitted into the Association must be proposed by two members. Foreigners resident abroad and distinguished in the Art, Science, or Literature of Music, may be nominated by the Council for election as Honorary Members of the Association.

Elections will take place by ballot of the members present at any of the ordinary meetings, and one adverse vote in four shall exclude.

No newly elected member shall be entitled to attend the meetings until the annual subscription be paid.

SUBSCRIPTION.

The annual subscription to the Association is one guinea, which shall become due on the 1st of November in each year.

Any member *may*, upon or at any time after election, become a life member of the Association by payment of a composition of £10 10s. in lieu of future annual subscriptions, but in addition to any annual subscription previously paid or due from such member. Such sums shall from time to time be invested in legal security in the names of Trustees, to be appointed by the Council.

Any member intending to resign his membership shall signify his wish by notice in writing to the Hon. Sec. on or before the 31st of October, otherwise he shall be liable for his subscription for the ensuing year.

MEETINGS.

An ordinary meeting shall be held on the second Tuesday in every month, from November to June inclusive, at 8 P.M., when, after the despatch of ordinary business, Papers will be read and discussed, the reading to commence not before 8.15 P.M.

An annual general meeting of members only shall be held at 8 P.M. on the last Tuesday in October, to receive and deliberate on the Report of the Council, and to elect the Council and officers for the ensuing year.

Special general meetings may be summoned whenever the Council may consider it necessary; and they shall be at all times bound to do so on receiving a requisition in writing from five members, specifying the nature of the business to be transacted. At least one week's notice of such special meeting shall be given by circular to every member, and ten members present at any general meeting shall constitute a quorum.

Every member shall have the privilege of introducing one visitor at the ordinary meetings, on writing the name in a book provided for that purpose, or sending a written order.

COMMUNICATIONS.

Papers proposed to be read at the meetings may treat of any subject connected with the Art, Science, or History of Music, Acoustics, and other kindred subjects.

Papers will be received from or through any member of the Association.

Experiments and performances may be introduced, when limited to the illustration of the Paper read.

All communications read will become thenceforth the property of the Association (unless there shall have been some previous arrangements to the contrary), and the Council may publish the same in any way and at any time they may think proper.

REPORTS.

A Report of the Proceedings of the Association, including the Papers read or abstracts of the same, and abstracts of the Discussions, shall be printed and distributed to the members as soon as possible after the end of each session.

This Report will be arranged and edited by the Honorary Secretary, under the direction of the Council.

COUNCIL AND OFFICERS.

The management of the affairs of the Association shall be vested in a Council, to be elected by ballot at the general meeting of the members on the last Tuesday in October.

The Council shall consist of a President, Vice-Presidents, and ten ordinary members of the Association.

The Honorary Secretary of the Association shall be *ex officio* an ordinary member of Council.

The President, Vice-Presidents, Auditors, and five ordinary members of the Council shall retire every year, but shall be eligible for re-election.

At the annual general meeting in October, the Council shall present a balloting list, showing the names of the persons whom they propose for the offices of President, Vice-Presidents, and ordinary members of Council for the ensuing year. A copy of this list shall be given to each member present.

In voting, each member may erase any name or names from the balloting list, and may substitute the name or names of any other person or persons whom he considers eligible for each respective office; but the number of names on the list, after such erasure or substitution, must not exceed the number to be elected to the respective offices as above enumerated. Those lists which do not accord with these directions shall be rejected.

The Chairman of the meeting shall cause the balloting papers to be collected, and after they have been examined by himself and two scrutineers, to be appointed by the members, he shall report to the meeting the result of such examination, and shall then destroy the balloting papers. Auditors shall be appointed at the annual general meeting by the members, and the statement of accounts shall be sent by the Treasurer to the Auditors, and be remitted by them to the Secretary in time to enable the Council to judge of the prospects of the Association, and to prepare their report in accordance therewith.

The Council and officers shall meet as often as the business of the Association may require, and at every meeting three members of Council shall constitute a quorum.

ENACTMENT OR ALTERATION OF RULES AND REGULATIONS.

No rules and regulations can be enacted, altered, or rescinded, except at a special meeting of members summoned for the express purpose, the summons stating distinctly and fully the matter to be brought under consideration.

MUSICAL ASSOCIATION.

FOR THE INVESTIGATION AND DISCUSSION OF SUBJECTS CONNECTED WITH THE ART AND SCIENCE OF MUSIC.

FOUNDED MAY 29, 1874.

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MUSICAL ASSOCIATION.

FIFTEENTH SESSION, 1888-89.

REPORT.

The Annual General Meeting of the Musical Association was held at No. 27, Harley Street, W., on Monday, October 28, 1889:

Major Crawford in the Chair.

The following Report *of the Council was read by the Secretary:—*

1. In presenting to the Members the fifteenth Annual Report, the Council is glad to be able to announce, as usual, the continued prosperity and usefulness of the Musical Association. During the session now coming to a close, papers have been read by Messrs. Ridley Prentice, Edmund H. Turpin, F. Corder, G. A. Audsley, E. J. Payne, E. F. Jacques, Arthur Hill, and D. J. Blaikley. These papers, together with their several discussions, have been printed in the Proceedings of the Association, a copy of which has been sent to every Member.

2. In the Report presented to the last General Meeting allusion was made to the loss which the Association had sustained by the deaths of Professor Sir G. A. Macfarren and Mr. William Chappell, and it is with feelings of the sincerest sorrow that the Council has to make a similar announcement this year. Dr. W. H. Monk, a Vice-President of the Association, died last March, and in the following month the President, the Rev. Sir F. A. Gore Ouseley, also passed away suddenly. Messages of condolence were in each case sent, on behalf of the Association, to the relatives, but the Council desires to record in this place its sense of the great abilities severally exhibited by the deceased gentlemen in furtherance of the ends of true musical art.

3. It is a matter for congratulation that the membership has increased somewhat during the past year. While gladly recognising this encouraging sign of interest in the Association, the Council would still urge upon the individual

members to do their utmost to promote continued progress in this direction, as there is always a drain upon the strength of the Association in the shape of death and resignation. In the latter case, inability to attend the meetings is frequently pleaded, but the Council would point out that the return to Members for their subscriptions is not only the privilege of listening to the various papers, but the consciousness of supporting a Society which exists solely that valuable contributions to Musical Literature, such as those comprised in the Annual Reports of the last fifteen years, may be read, discussed, and published. If the Members generally were not sensible of this, the usefulness of the Association would be at an end.

4. The Balance Sheet, duly audited, lies upon the table for the inspection of Members. There is still a small balance owing to the Treasurer, and the Council must again draw the attention of Members to the inconvenience resulting from laxity in the payment of subscriptions, to which cause alone is attributable the above unsatisfactory item in the year's accounts. It is obvious that the Balance Sheet must be based, not upon the amount recoverable, but upon the amount actually received by the Treasurer during the financial year.

5. Arrangements are in progress for the next session. The Council will always be glad to receive, from or through Members, offers of papers to be read at the Meetings, while shorter communications will also be welcome.

6. In accordance with the rules, the Vice-Presidents and five Ordinary Members of Council, Messrs. Barry, Cummings, Prendergast, Prout, and Southgate retire from office. The Council makes the following proposals to fill up the vacant offices: To be President, Sir John Stainer, M.A., Mus. Doc., in place of the late Sir Frederick Ouseley; to be new Vice-Presidents, Mr. W. H. Cummings and Dr. C. Hubert H. Parry; and to be an Ordinary Member of Council, in place of Mr. W. H. Cummings, Dr. Charles W. Pearce. With the exception of these changes, the other gentlemen who retire are recommended for re-election; but Members are reminded of their right to nominate others for office.

THE MUSICAL ASSOCIATION.

Hon. Treasurer's Statement of Receipts and Disbursements from November, 1888, to October, 1889.

Dr.

	£	s.	d.
To Subscriptions received for 1888	3	3	0
„ „ „ „ 1889	119	14	0
„ Sale of Copies of the Proceedings	4	10	0
„ Dividends on £350 at 2½ per cent.	8	10	4
„ Balance due to Treasurer	9	19	6
	£145	16	10

Subscriptions outstanding:—	£	s.	d.
3—1886	3	3	0
5—1887	5	5	0
12—1888	12	12	0
23—1889	24	3	0
Part subscription, 1887	0	13	0
	£45	16	0

Cr.

	£	s.	d.
By Balance due to Treasurer on last Account ...	4	7	0
„ Printing	62	13	6
„ Advertising	7	10	0
„ Reporting	16	5	6
„ Rent of Rooms	14	3	6
„ Petty Expenses	10	17	4
„ Assistant Secretary's Salary	30	0	0
	£145	16	10

Examined and found correct,

W. S. COLLARD,
D. J. BLAIKLEY, } *Auditors.*

ALFRED H. LITTLETON,
Hon. Treasurer.

November 4, 1889.

C. A. BARRY, Esq.,

In the Chair.

ON THE MUSICAL SCALE.

By Rev. W. J. Habens, B.A. (London), Inspector-General of New Zealand Schools.*

In a footnote to Blaserna's "Theory of Sound in relation to Music" (p. 94), it is stated that Euler was acquainted with the importance of the numbers 2, 3, and 5, and that he "established upon them a rule for the development of our musical system." To understand this statement it is necessary to know that a musical note is an effect of regular vibrations of a sounding body—that is to say, of vibrations occupying equal intervals of time; and that two notes cannot be consonant unless the proportion subsisting between their two rates of vibration is simple. These things being understood, it may be shown that the importance of the numbers 2, 3, and 5, employed for the purpose of expressing the ratios of vibration rates, cannot be overestimated. When the intervals between musical notes are expressed by the ratios of the vibration rates of the notes, these three numbers alone, with their squares, cubes, and other powers, and numbers arising from their intermultiplication, are capable of expressing the ratios of consonant notes; and not only so, but they alone are capable of expressing the ratios of all notes belonging to the same scale, and of all notes belonging to all scales into which it is possible to pass from the original scale by modulation.

Any prime number higher than 5 occurring in the expression for the ratios of two notes indicates that those two notes

* Mr Habens being resident in New Zealand, the paper was read by the Assistant Secretary.

cannot both belong to the same musical system. For example, if for every 6 vibrations of one note another note has 7 vibrations, these notes are not musically related, they cannot even enter together into any discord recognised in music. Two notes having the ratio 14 : 7 are at the interval of an octave, but this ratio ought to be written 2 : 1, and 7 has nothing to do with the ratio.

The simplest ratio is 2 : 1, where the higher note is an octave above the lower. The ratio 4 : 1 expresses an interval of two octaves, and 8 : 1 three octaves. If we consider only the ratios of consecutive numbers, and take them in order, beginning with the simplest, the intervals are found to be as follows :—

Ratio 2 : 1	—	Octave.
,, 3 : 2	—	Perfect fifth.
,, 4 : 3	—	Perfect fourth ($2 \times 2 : 3$).
,, 5 : 4	—	Major third ($5 : 2 \times 2$).
,, 6 : 5	—	Minor third ($3 \times 2 : 5$).
,, 7 : 6	—	No relation (7 is prime).
,, 8 : 7	—	,, (,,).
,, 9 : 8	—	Greater tone ($3 \times 3 : 2^3$).
,, 10 : 9	—	Lesser tone ($5 \times 2 : 3^2$).
,, 11 : 10	—	No relation (11 is prime).
,, 12 : 11	—	,, (11 ,,).
,, 13 : 12	—	,, (13 ,,).
,, 14 : 13	—	,, (7×2 and 13).
,, 15 : 14	—	,, ($5 \times 3 : 7 \times 2$).
,, 16 : 15	—	Semitone ($2^4 : 5 \times 3$).

The next ratio in the series that is not to be rejected on account of primes higher than 5 is—

Ratio 25 : 24 — Minor semitone ($5^2 : 3 \times 2^3$).

And the next is—

Ratio 81 : 80 — Comma ($3^4 : 5 \times 2^4$).

This last interval is the difference between the intervals of the greater tone and lesser tone (the ratio of $\frac{9}{8}$ to $\frac{10}{9}$, that is, of $\frac{90}{80}$ to $\frac{80}{81}$). The ratio 25 : 24 belongs to the interval of the lesser semitone, which is the difference between the major third and the minor third (the ratio of $\frac{5}{4}$ to $\frac{6}{5}$, that is, of $\frac{30}{24}$ to $\frac{30}{25}$).

It will be seen that all the numbers that are not rejected are the numbers 2, 3, and 5, and numbers resulting from raising these to higher powers, or from their inter-multiplication. The intervals obtained from ratios of consecutive numbers alone are, as has been shown, the octave, perfect fifth, major third, minor third, greater tone, lesser tone, semitone, lesser semitone, and comma. Several other intervals are obtained from these by inversion. It is evident that such intervals must belong to the same system, and must rest on the ratios of 2, 3, and 5. For inversion means

substituting for one of the two notes whose pitch is under consideration the octave of that note, and the change thus effected is expressed by halving the higher number of the ratio, or doubling the lower. Thus, the ratio of the minor third is 6 : 5, and the ratio of the major sixth resulting from its inversion is 3 : 5. The major third expressed by the ratio 5 : 4 becomes by inversion the minor sixth, of which the ratio is 5 : 8. The inversion of the tone gives the minor seventh, of which there are two forms corresponding to the greater tone and lesser tone; the ratio of one being $\frac{9}{16}$, and of the other $\frac{5}{9}$. The inversion of the octave gives an octave, and the inversions of the fifth and the fourth give respectively the fourth and the fifth.

There are other intervals in the scale, intervals of which the ratios are more complex, but all accordant with the law that admits no factors but 2, 3, and 5. Such intervals are—

Imperfect fifth	—	64 : 45, that is $2^6 : 5 \times 3^2$.
Tritone	—	45 : 32, „ „ $5 \times 3^2 : 2^5$.
A minor third $\left(^{\text{F to D}}_{\text{in key C}}\right)$	—	32 : 27, „ „ $2^5 : 3^3$.

From the consideration of intervals we may now advance to the construction of the scale. The ratios of 2, 3, and 5 indicate three closely related notes; for if in some definite short space of time, say the sixteenth part of a second, a sounding body executes one vibration and gives forth a low note, say C, then another sounding body executing two vibrations in the same time will give forth a note an octave above this C; four vibrations in the same time are executed by a body giving forth a note an octave above the second C; three vibrations by a body sounding G, five vibrations by one sounding E. The vibrations 1, 2, 3, 4, 5, occurring in the same time, belong to notes constituting a common major chord. This fact may be represented graphically by a line divided into equal parts, of which each represents one vibration in the given time (*see* Fig. 1, p. 4).

If now a common chord with G instead of C for a bass be found, that is to say, if two notes be ascertained having the same relation to G that E and G have to C, the two notes thus found are B and D. And again, if a common chord be found in which the three notes occur in the same order as C, E, and G, but C occupies in the new chord the position occupied by G in the original chord, the three notes of the new chord are F, A, C. Thus all the notes in the scale of C are found. In the diagram, as the octave between 3 and 6 has three equal divisions, let three equal divisions be taken in the octave from 2 to 4, and by this means F and A are found. As at 3 G falls half-way between C and C, insert a note D half-way between G and G, and half-way between G and this new note put in B, just as E falls half-way between C and G.

This statement may be graphically expressed as follows (*see* Fig. 2) :—

Fig. 1.

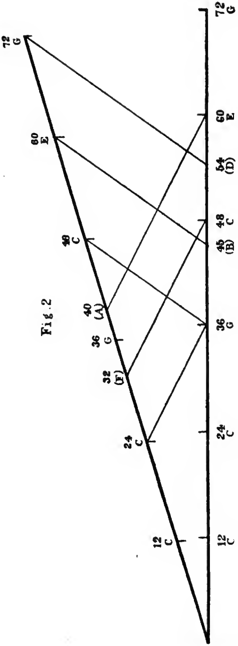


Fig. 2.

Let the horizontal line have the same meaning as before, but to avoid fractions suppose the time in which the vibrations occur to be twelve times as long as before, so that each of the six original divisions represents 12 vibrations. Draw a similarly divided line making any angle with the other, and complete a triangle by joining the points C 48 and G 36. Lines drawn parallel to this third line will cut the two other lines proportionally. Lines so drawn from E and G will therefore give the places of B and D (45 and 54).

Similarly if C 24 and G 36 are joined, two parallel lines from C and E will give the places of F and A (32 and 40).

In this way the seven notes of the scale in consecutive order from F to E are obtained, the ratios of their vibrations being as follows—

$$32, 36, 40, 45, 48, 54, 60.$$

These numbers are all compounded of numbers belonging to the group 2, 3, 5. Expressed in terms of this group they are—

$$2^5,\ 3^2\times2^2,\ 5\times2^3,\ 5\times3^2,\ 3\times2^4,\ 3^3\times2,\ 5\times3\times2^2.$$

To express the scale from C to C it is necessary to take the octaves of some of the notes. The octaves below the notes represented by the three highest numbers must be represented by the halves of these numbers, and the order will be—

$$24, 27, 30, 32, 36, 40, 45, 48.$$

Expressed in terms of the series 2, 3, 5, the vibrations of these notes are—

$$3\times2^3,\ 3^3,\ 5\times3\times2,\ 2^5,\ 3^2\times2^2,\ 5\times2^3,\ 5\times3^2,\ 3\times2^4$$

From this it is evident that if the vibrations of C and its octave are expressed by the ratio 1 : 2, the vibration numbers for the several notes of the scale from C to C are in the following proportion :—

$$1,\ \tfrac{3^2}{2^3},\ \tfrac{5}{2^2},\ \tfrac{2^2}{3},\ \tfrac{3}{2},\ \tfrac{5}{3},\ \tfrac{5\times3}{2^3},\ 2.$$

In this statement it appears very clearly that only the ratios of 2, 3, and 5 are concerned in the relations of the several notes of the scale to each other. But it is advisable to express these fractions in a more familiar way, as follows :

$$1,\ 1\tfrac{1}{8},\ 1\tfrac{1}{4},\ 1\tfrac{1}{3},\ 1\tfrac{1}{2},\ 1\tfrac{2}{3},\ 1\tfrac{7}{8},\ 2.$$

It must be borne in mind that the interval between two notes whose vibration numbers are to one another in the ratio of two fractions in this series cannot be adequately expressed by the difference of the two fractions. Thus the difference between 1 and $1\frac{1}{8}$ is $\frac{1}{8}$, but this does not express the relation between C and D. For in the next octave the vibration numbers of C and D are represented by 2 and $2\frac{1}{4}$, and the difference in this case is $\frac{1}{4}$ instead of $\frac{1}{8}$. Moreover, the difference which from one point of view is $\frac{1}{8}$, is from another point of view $\frac{1}{9}$, for the difference $\frac{1}{8}$ is one-eighth of the lesser quantity 1, but it is one-ninth of the greater quantity $1\frac{1}{8}$. The fundamental way of regarding the interval is to regard it as depending on a ratio of vibrations, the ratio of the

vibrations of D to those of C being 9 to 8. Looked at from this point of view the intervals in the scale of C from each note to the next, step by step, are indicated by ratios as follows:—

C to D, $24:27 = 8:9$.
D to E, $27:30 = 9:10$.
E to F, $30:32 = 15:16$.
F to G, $32:36 = 8:9$.
G to A, $36:40 = 9:10$.
A to B, $40:45 = 8:9$.
B to C, $45:48 = 15:16$.

It thus appears that the intervals of the second are of three magnitudes. Between E and F the ratio is $15:16$, as also between B and C, and the interval indicated by the fraction $\frac{15}{16}$ or $\frac{16}{15}$ is the semitone. Between C and D, as also between F and G, and between A and B, the ratio is $8:9$, and the interval indicated by $\frac{8}{9}$ or $\frac{9}{8}$ is the greater (major) tone. The third magnitude is the ratio $9:10$ between D and E, and between G and A, and the interval indicated by $\frac{9}{10}$ or $\frac{10}{9}$ is the lesser (minor) tone. The order in which these intervals appear in ascending from C to C is—

Greater Tone, Lesser Tone, Semitone, Greater Tone, Lesser Tone, Greater Tone, Semitone.

In a rude way these intervals may be approximately compared by means of fractions, thus: if by $\frac{1}{9}$ we agree to understand $\frac{1}{9}$th of the vibration number of the lower of two notes we may say that the note which is a lesser tone above it is sharper by $\frac{1}{9}$th; or, if by $\frac{1}{9}$ we agree to understand $\frac{1}{9}$th of the vibration number of the higher of two notes, we may say that the note which is a greater tone below it is flatter by $\frac{1}{9}$th. On the first understanding the tones and semitones in the ascending scale will appear as—

$$\tfrac{1}{8},\ \tfrac{1}{9},\ \tfrac{1}{15},\ \tfrac{1}{8},\ \tfrac{1}{9},\ \tfrac{1}{8},\ \tfrac{1}{15}.$$

On the other understanding they will appear as—

$$\tfrac{1}{9},\ \tfrac{1}{10},\ \tfrac{1}{16},\ \tfrac{1}{9},\ \tfrac{1}{10},\ \tfrac{1}{9},\ \tfrac{1}{16}.$$

These statements bring out in a rough way the inequality of the greater and lesser tones, and show that the semitone is greater than the half of either tone; but the fact that the two inconsistent statements are equally tolerable is enough to show that they are both untrue.

In order to express intervals satisfactorily, we require a notation by which any number of intervals that together make up some greater interval may be expressed by a series of numbers, the addition of which will result in a total that will consistently express the greater interval. While our only consistent method of indicating intervals is the employment of ratios, we must multiply the ratios proper to the lesser intervals to obtain a consistent expression for the greater interval which together they make up.

For example, a greater tone, a lesser tone, and a semitone occupy the whole interval from C to F, which is the interval of a fourth. The ratios proper to the three constituent intervals are respectively $\frac{9}{8}$, $\frac{10}{9}$, and $\frac{16}{15}$, and the ratio proper to the whole interval (the fourth) is $\frac{4}{3}$. The product of the three smaller fractions is the greater fraction ($\frac{9}{8}\times\frac{10}{9}\times\frac{16}{15}=\frac{4}{3}$). Again, the ratio of the vibrations of the upper to the lower note at an interval of an octave is 2 : 1, and this is the product of the ratios of all the separate intervals in the scale ($\frac{9}{8}\times\frac{10}{9}\times\frac{16}{15}\times\frac{9}{8}\times\frac{10}{9}\times\frac{9}{8}\times\frac{16}{15}=\frac{2}{1}$).

Every one that is familiar with the theory or with the use of logarithms will see at once that, in order to obtain expressions for these intervals of such a nature that addition may be substituted for multiplication in the compounding of intervals, we have only to substitute for the ratios the logarithms of those ratios and the problem is solved. For this purpose any system of logarithms will answer, the common system of logarithms to base 10 as well as any other.

In the common system of logarithms the logarithm of 2 is ·3010300. If this number is taken to represent the interval of an octave, then the logarithms of $\frac{9}{8}$, $\frac{10}{9}$, and $\frac{16}{15}$ will represent the intervals of the greater tone, lesser tone, and semitone respectively. These logarithms are—

$$\text{Log. } \tfrac{9}{8} = {\cdot}0511525.$$
$$\text{Log. } \tfrac{10}{9} = {\cdot}0457575.$$
$$\text{Log. } \tfrac{16}{15} = {\cdot}0280287.$$

From this it appears that if the octave is represented by a line 301 inches in length, the greater tone is about 51 inches, the lesser tone about 46 inches, and the semitone about 28 inches. Three greater tones (153), two lesser tones (92), and two semitones (56) make up the octave (301). These numbers are only approximately proportional to the logarithms, and the logarithms themselves are only approximately correct, and would be only approximately correct if they were carried to any number of decimal places beyond the seventh, which is the last here given.

With the human voice or on any stringed instrument a skilful artist can render the intervals more correctly than any logarithmic expressions can indicate them. But on a keyed instrument tuned to suit fifteen major and twelve minor keys and having only twelve notes in the scale, it is impossible to perform with correct intonation. To say that an instrument is equally adapted to all these cases is in effect to say that it is equally unrelated to them all. If the octave, represented by the logarithm ·3010300, is divided into twelve equal intervals called semitones, each of these is represented by ·0250858, whereas the true semitone is represented by ·0280287. The tempered semitone therefore is about $\frac{25}{28}$ths of a true semitone, and the tempered tone (·0501717) is about $\frac{50}{51}$ of the greater

tone, and about $\frac{50}{46}$ths of the lesser tone. Of the intervals of the tempered scale the fifth and the fourth (which is the difference between the fifth and the octave) approximate most nearly to the corresponding intervals of the true scale. The true fifth is sharper than the tempered fifth (and the true fourth flatter than the tempered fourth) to the extent of about $\frac{1}{614}$th of an octave, the fraction being very nearly $\frac{1}{613\cdot 8106}$. The difference is represented by the ratio of $\frac{886}{885}$; that is to say, if a monochord is divided by a bridge in such a way as to have 885 equal parts on one side of the bridge and 886 equal parts on the other side, the difference of pitch between the two lengths of the string is the correction a tuner has to make after he has obtained G as a true fifth from C, this correction being made for the sake of equal temperament. If the octave is represented by the logarithm of 2, that is, by ·301029995664, this difference is ·000490428252.

The errors of the notes of the tempered scale may be very conveniently expressed in terms of this small quantity taken as a unit. Taking the tonic of any key as the standard of comparison for the other notes and using the sol-feggio syllables we may state the errors of the notes of the tempered scale as follows :—

Re	—	2 units flat
Mi	—	7 units sharp
Fa	—	1 unit sharp
Sol	—	1 unit flat
La	—	8 units sharp
Si	—	6 units sharp

Since the unit is about the 614th part of an octave, and the tempered semitone is therefore equal to about 51 units, it appears that the error of La is about the sixth or seventh part of a semitone, an error of too serious a magnitude to be disregarded, and the errors of Mi and Si are not much less considerable.

The amount of error as stated above is absolutely correct for Fa and Sol, and also for Re, but it is slightly inaccurate for Mi, La, and Si, the extent of the inaccuracy being exactly the same for each of these three notes. This error is remarkably small, being only about $\frac{16}{13}$ths of the millionth part of the octave. The comma, the difference between the greater and lesser tones, and corresponding to the ratio $\frac{81}{80}$, is greater than eleven units by ·000000321116 if the octave is ·301029995664, and this difference is the only correction that is required to make the foregoing statement of the errors of Mi, La, and Si perfectly accurate.

The question now arises—what number of notes within the compass of an octave must a keyed instrument have in order that within the limit of error last stated (rather more than the millionth of an octave for each of three notes in every

scale) it may be possible to play fifteen true major scales and fifteen corresponding minor scales? The number required is 52, more than four times the number now in use.

In passing from the key of C into the key of G it is not enough to substitute F♯ for F. It is necessary to alter A also; for in the scale of C the note A is a lesser tone above G, while in the scale of G the note A must be a greater tone above the tonic. Similarly, if the modulation is from the key of C into the key of the subdominant, it is not enough to substitute B♭ for B; the D also must be changed, so that between it and the unchanged C there may be a lesser tone instead of a greater tone. Thus (without taking minor keys into account for the present) to the seven notes of the scale of C must be added two new notes for every new key ascending by fifths, and two new notes for every new key descending by fifths, or twenty-eight new notes in all, bringing up the number to thirty-five. Seventeen other new notes are required as sharp fourths and fifths of major scales to be used in the relative minor scales. These notes must be regarded as intended to divide the interval between Mi and La in the same way as the sixth and seventh divide the interval between Sol and Do. The errors of these notes in the tempered scale are exceedingly large, amounting to 16 units and 14 units respectively, and it should be remembered that 16 units is nearly a third of a tempered semitone (51·15 units). The La is, as has been stated, 8 units sharp, and the semitone between it and the new leading note is in the tempered scale 6 units smaller than a true semitone, so that the whole error of this leading note is 14 units; and the tempered tone is too small by 2 units for the greater tone which is required between the two sharps, so that the error of the lower of the two sharps is 16 units. Of the seventeen new notes required for minor scales the three middle scales (F, C, and G major) require five—viz., F♯ and G♯ for C, C♯ for F and G, D♯ for G, and B♮ for F. Every other key requires two notes of this class, but only one of the two is original to each key, the other two being borrowed from a key nearer to C. These seventeen notes bring up the number to 52.

Of these 52 notes, three notes belonging to minor scales may be dispensed with—viz., C♯♯, G♯♯, and F made natural from F♭, seeing that the minor keys in which alone they occur are not in use. It is, however, convenient to show their places in a general scheme, and the scheme gains in consistency by taking them into account.

Moreover, 17 other notes out of the 52 are of very little value, because each of them lies very close to a companion note that must find a place in the scale. The difference between such a note and its companion is exactly one unit, the smallest error in the tempered scale, being the 51st part

of a tempered semitone. Such a note is F flat, which differs by a unit from its companion note, E. If these notes are disregarded there are (52 less 17) 35 notes required instead of the 12 generally recognised, that is, three notes for every existing note with the exception of one, and two notes for that one. The one exception is B♭ or A♯, for which two forms instead of three will suffice if the small distinction between a note and its companion note is disregarded.

The three forms of each note are—a middle form, a grave form, and an acute form; the interval between the middle form and either of the others being a comma, the interval corresponding to the ratio $\frac{81}{80}$, and containing about 11 units, or about a fifth of a true semitone. The interval therefore between the gravest and the acutest form of the same note is 22 units, or nearly two-fifths of a true semitone (and more than two-fifths of a tempered semitone), or three-fifths of the difference between a major third and a minor third. The extreme forms of G♯, for example, are 22 units apart, and the acutest form of G♯ is actually 23 units above the gravest form of A♭.

It will be more satisfactory to provide for 52 notes than for 35, and if every couple of companion notes (such as G♯ and A♭) is to be split up into its two separate notes, while we still regard these separate notes as forms of one note of the series of twelve in a keyed instrument, we shall require for some notes of the keyed instrument five forms and for others four.

As the place of each note is to be indicated by its distance in units from the note which represents it in a system of equal temperament, it is necessary to assume one note as being in unison with the corresponding note of the tempered system. The most convenient note for this purpose is E, because the discrepancies between the true and the tempered systems are equally balanced on both sides of that note, the extreme case of flattening (to the extent of 16 units in D♯ as a tonic) and the extreme case of sharpening (to the extent of 16 units in F♮ in a minor key) being cases of equal error.

The following table shows, opposite to the name of each note of a keyed instrument, the several notes which that note has to do duty for, and the number of units by which it requires to be raised or depressed to represent each of those several notes accurately, the signs + and — being used for necessary sharpening and flattening respectively. The middle form of E being made to accord perfectly with that note on a keyed instrument, the acute form of E is to be obtained by means of a monochord divided by a bridge into two parts in the proportion of 80 to 81, and tuned so that the longer part shall give E in unison with the E of the keyed instrument; the shorter part will give the acute E, sharper

than the other by a comma. By a similar process the grave form of E, flat by a comma, is to be obtained. All the other notes are to be obtained from these by fifths ascending or descending. The grave E is E natural, made natural for the purposes of a minor key, and from it are obtained 11 notes by fifths ascending, the last of the 11 being G♯♯, and 5 notes by fifths descending, the last being F♮. All these notes are notes required only in minor keys, and they are indicated in the table by being enclosed in brackets. Not only does the number against each note indicate the number of units by which that note differs from the corresponding note of the keyed instrument, but also the difference between this number and the number proper to the E from which the note is derived shows at how many removes by fifths the note lies from E.

From the acute form of E are derived 5 notes by ascending fifths to D♯, and 12 notes by descending fifths to F♭. Every note used in a major scale as a tonic or as a dominant or subdominant or as the second note of the scale, and these same notes when they occur in the relative minor scale, must be chosen from this set of notes, and except in such relations the notes of this set are not to be used. The notes of this set are marked by square brackets.

The rest of the notes are derived from the middle form of E, by fifths ascending (eight times) to B♯, and by fifths descending (eight times) to A♭.

TABLE OF 52 NOTES TO THE OCTAVE.

	Grave.		Middle.		Acute.	
C	(C♮−15)		C−4	(B♯−3)	[C+7]	B♯+8
B		(B♮−10)	[C♭ ±0]	B+1		[B+12]
B♭	B♭−6	(A♯−5)	[B♭+5]	A♯+6		
A	(A♮−12)		A−1	(G♯♯±0)	[A+10]	
G♯	A♭−8	(G♯−7)	[A♭+3]	G♯+4		[G♯+15]
G	(G♮−14)		G−3	(F♯♯−2)	[G+8]	
F♯		(F♯−9)	[G♭+1]	F♯+2		[F♯+13]
F	(F♮−16)		F−5	(E♯−4)	[F+6]	E♯+7
E		(E♮−11)	[F♭−1]	E ±0		[E+11]
D♯	E♭−7	(D♯−6)	[E♭+4]	D♯+5		[D♯+16]
D	(D♮−13)		D−2	(C♯♯−1)	[D+9]	
C♯		(C♯−8)	[D♭+2]	C♯+3		[C♯+14]

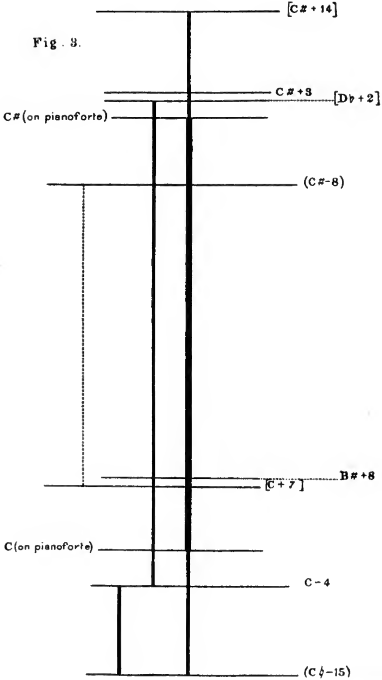
The accuracy of this table may be tested by selecting from it the notes belonging to any one scale, and seeing whether the numbers expressing the distances of the several notes from the corresponding notes of the equal temperament scale are consistent with the statement that has been made of the amounts of error of the several notes of the equal temperament scale. According to that statement the errors of the equal temperament require the following corrections, if the error of Do is assumed to be nil:—Re+2, Mi−7, Fa−1, Sol+1, La−8, Si−6. Therefore if in the scale of C the keynote has for its number of units of error, +7, the number shown in the table, then the numbers for the other notes of the scale in order ought to be the numbers arising from the addition of 7 to the numbers just assigned to Re, Mi, Fa, &c. The numbers so arising are as follows: +9, +0, +6, +8, −1, +1. It will be found on inspection that these are the numbers given in the table for [D], E, [F], [G], A, and B, respectively. Similar results will attend a similar test applied to the other scales, if it is borne in mind that in every scale Do, Re, Fa, and Sol must be selected from the notes marked with square brackets.

In the following diagram (Fig. 3, p. 13) the inadequacy of the system of equal temperament and the character and extent of its errors are illustrated in a visible form. The perpendicular heavy line represents a semitone of the equal temperament scale, from C to C♯. The faint lines in continuation of it show the extent to which the portion of the octave included between this C and this C♯ must be expanded, as it were, to make it include the places of all the notes for which these two notes have to do duty. The horizontal lines show (by their intersections with the perpendicular) the places of all the forms which C and C♯ justly assume in the course of modulation with true intonation. As the octave is equal to about 613·8 units, the heavy line for the equal temperament semitone represents 51·15 units.

The line drawn from [D♭+2] to C−4 represents a true major semitone. It is so placed as to be readily compared with the heavy line which represents an equal temperament semitone. The dotted line from (C♯−8) to [C+7] represents a minor semitone. The line drawn from C−4 to (C♮−15) represents a comma. The interval between C♯+3 and [D♭+2] is the unit of which so much use has been made in this paper, as also is the interval between B♯+8 and [C+7].

The advocates of equal temperament are accustomed to regard as insignificant the errors of which the nature and magnitude have been thus exhibited. It may be doubted whether they have ever adequately understood the extent to which the errors reach, and the degree in which voices and

Fig. 3.



stringed instruments are compelled to depart from true intonation under the tyranny of the pianoforte and the modern organ.

No doubt the complexity of a keyed instrument made to satisfy the demands of just intonation must be very great. Even if the difficulties of manipulation were reduced to a minimum by means of a moveable keyboard, which would lend itself to the application of the Tonic Sol-fa notation to music for the pianoforte and organ, the great number of strings or pipes would constitute a great difficulty with respect to construction and to expense. But unless difficulties of this kind can be surmounted it is to be hoped that a study of the true relations of the notes of the scale in melody and in harmony will lead to the cultivation of vocal and orchestral music, and of music of every kind for stringed instruments, in ways that will render them independent of the pianoforte and organ.

NOTE.—In this paper the fullest deference has been paid to the consensus of authorities by which the place of the supertonic is fixed at a greater tone above the tonic. According to this rule the interval between the tonic and the mediant is divided into a greater and lesser tone, the greater tone coming first in the ascending order. It is a question worth considering, however, whether this rule is without exception. It has the merit of exhibiting a certain symmetry in the order of the vibration numbers, inasmuch as if the numbers for the tonic and mediant are 24 and 30, the number for the supertonic is by this rule 27 and falls exactly midway between 24 and 30. But the relations of the supertonic with some other notes of the scale are not of the best if this rule is absolute. It is impossible to have a D which is at the same time a fifth above G and a fifth below A. Are there not occasions when the supertonic and the submediant ought to be separated by an interval of a true fifth, that is to say, are there not occasions when the graver form should be substituted for the acuter form of the supertonic? Is there not sometimes a slide made from one form to the other in artistic vocalisation? And in the key of A minor does it not seem desirable to have a note in the scale a true fourth above and a true fifth below A? It is remarkable that the graver form of the supertonic is given by a process very similar to that by which the acuter form is found, the difference of process being that lengths of string are considered instead of vibrations.

It will be remembered that the relations of C, E, G, having been determined by the ratios of their vibration numbers, which are as 4, 5, and 6, the other notes of the scale were found by constructing two chords similar to the chords C, E, G, one chord beginning with G as its lowest note and the other

ending with C as its highest note. Now, if lengths of string are considered, lengths 6, 5, and 4 are the lengths of three notes forming a minor chord, A, C, E. If the lowest of these notes be made the highest of a similar chord, and the highest of them be made the lowest of another similar chord, the new chords are—first, D, F, A; and second, E, G, B. The D found by this process is the graver D, flatter by a comma than the recognised supertonic in the major key of C. With respect to length of string, this note exhibits the same kind of symmetry as the other D exhibits with respect to vibrations, that is, it lies just half-way between C and E. If the lengths for C and E are 30 and 24 (as 5 to 4), the length for grave D is 27, the length for acute D is $26\frac{2}{3}$, and the ratio of the two forms is 81 : 80, the ratio of the comma. There is a strong temptation to argue that as the string is in the order of nature and time before the vibrations which are only affections of the string, a scale derived from a consideration of the symmetry of the proportions of lengths of string has an *a priori* claim to regard. The answer, of course, is that the phenomena of sound do not emerge until vibrations are set up, and that the vibrations therefore deserve the chief consideration.

It is, however, interesting to observe that from the simplest relations of string lengths the chord first derived is the minor chord, and that, as if with an appreciation of that fact, the author of our musical notation gave a singular prominence to the minor relations of the scale by using the first letter of the alphabet, not for the tonic of the open major scale, but for the keynote of the open minor scale; and it is also interesting to observe that, if the grave supertonic is adopted, the intervals of the major scale expressed in lengths of string afford a singular apparent justification for the use of the terms tone and semitone. Thus, if 60 parts of a string give C, the parts cut off successively in a diatonic ascent to the octave are—

$$\underline{6,\ 6,\ 3,}\ 5,\ \underline{4,\ 4,\ 2.}$$

In this succession of intervals, such a group as 6, 6, 3, or 4, 4, 2, appears to warrant the recognition of the first two intervals in the tetrachord as equal intervals, and the next interval as exactly the half of either of them. It is to be observed also that with this construction a scale has two exactly similar tetrachords, 6, 6, 3, and 4, 4, 2; and that these are separated by a tone exactly intermediate in value between 6 and 4. Are such considerations as these to be altogether ignored? Does it not seem that there ought to be some scientific recognition of a kind of elasticity about the supertonic, or of a necessity for two forms of it? From this point of view it may be necessary to modify the rule of

selecting supertonics from the set of notes from which tonics, dominants, and subdominants must be selected; in that case a new note must be added to the table—viz., D♭ – 9 for occasional use in the key of C♭.

NOTE 2.—The ordinary logarithms to seven places are not quite full enough for the investigation of this subject. The logarithms of 2, 3, and 5 to 12 places are therefore given here:—

Log. 2 = ·301029995664.
Log. 3 = ·477121254720.
Log. 5 = ·698970004336.

With ·301029995664 for the interval of an octave the most necessary logarithms deduced from the above are—

12th of an octave	—	·025085832972.
True Semitone	—	·028028723600.
Minor Tone	—	·045757490560.
Major Tone	—	·051152522448.
Comma	—	·005395031888.
Unit	—	·000490428252.

DISCUSSION.

THE CHAIRMAN.—Ladies and gentlemen, I am sure you will all be agreed that we have listened to a paper which represents an immense amount of study, thought, and calculation; but I think we shall all be agreed it is one of more interest to scientists than to practical musicians. Before discussing this point, however, I think we should record a vote of thanks to the writer of the paper. [The vote was passed unanimously].

MR. HERBERT.—I came here this evening imagining that an attack would be made on equal temperament, and, having had a great deal to do with it for the last thirty odd years, I wished for the opportunity of giving my experience on the subject. I will not enter into the circumstances which led me to take charge of the Roman Catholic choir in Farm Street, I only tell you I did so in September, 1852, and that my first step was to have the organ re-tuned equally by Messrs. Hill. I was totally alone, everyone was against me, and I was about the best abused man in London for some time. All the builders opposed me, and the organists mostly did not know much about it. My own master, George Cooper, one of the best players and best masters that ever lived, came to try the organ, and was so pleased that he had his own at Christ's Hospital tuned equally also. Shortly after that I presume Sir John Goss went to hear the Christ's Hospital organ, and the consequence

of that was that St. Paul's was tuned equally. I met old Mr. Bishop in the street very shortly after St. Paul's had been tuned, and I said: "Well, Mr. Bishop, I hear you have tuned St. Paul's equally." "Yes," he said, "we have, and I am bound to say the more I hear it the more I like it; and at the same time," added he, "I think they sing better in tune.' Now, here was a man over seventy years of age, who had done nothing all his life but tune perfect thirds and flat fifths, and heard nothing else, and yet that was his opinion to me. Another striking anecdote is this from Dr. Hopkins, who told it me himself. When he and Mr. Rogers, of Doncaster, went abroad to gather materials for their great work on the organ they took letters of introduction everywhere, and went to compare the organs and stops with those at home. Hopkins said: "Rogers, that is our diapason, that is our principal, that is this and that, but somehow it sounds different; I like it, Jerry" (Rogers' name was Jeremiah), "don't you?" and Jerry said he did. After some time Hopkins said, "What if it should be the temperament after all?" Now I will tell you on what grounds I defended the equal temperament. The old mean temperament had what was called a *wolf;* it had many wolves, but the special wolf was that sharp 5th in four flats—*i.e.*, A♭ and E♭, which rendered the key horrible; the third, A♭ and C, was also insufferable; and so the key of four flats was almost tabooed on the organ, though Bach wrote one Fugue in F minor for it. Accordingly what I had to combat was a temperament where, in the good keys, C, G, D, and so on (I ignored the wolves), the thirds were perfect, or nearly so, the fifths very flat (¼ of a comma), and the fourths equally sharp. Now, I said, I take you on your good keys, and I maintain that your diatonic scale, the Doh, Rey, Mi, Fa of the Tonic Sol-fa people, is something so vile, so bad, that no singer and no violin or cello player would tolerate it for a moment. My own master, the late Mr. Hancock, always used to abuse the organ, and declare it was never in tune. He did not mean the wolf, he meant the organ generally. Of course the thing cannot now be heard, but in those days it could, and if you compared the diatonic scale of the good keys in an organ tuned on the mean temperament with an organ tuned on the equal temperament, there could be but one opinion as to which was the best. On one occasion, when I had an organ tuned equally, I left the choir unequal, then called the clergy up into the organ loft, and without telling them which was which I said: "Fathers, I will play the same passages in harmony and melody on the two rows of keys, and you shall tell me which you like best." They said, "We like *that* the best"—they could not tell why, but they said it was more musical. Another curious experiment was tried that morning. I took

a mixture of 3, 5, 8 (of course they were tuned perfectly), I then drew a principal in the choir and played the same notes in a succession of chords, and let them hear the difference between those with mathematically perfect intervals and tempered ones, and the difference was very peculiar. In the perfect intervals we took scarcely any cognisance of the notes themselves, they sounded like one note; whereas in the tempered intervals you heard the parts distinctly, and I suggested at the time that it might be on that account that the equal temperament in part-music on the organ was more agreeable. In those days of the mean temperament, organists were taught to, and as a matter of fact did, play as full-handed as possible. With the introduction of the German organ with the 16-ft. stop on the manuals and German music generally, organists had to learn to play in parts, not less than four generally, if they could in five, and so on, so that it was part playing and no longer playing handfuls of notes. If you want to see what organ arrangements were in those days look at Dr. Crotch's arrangement of the Amen Chorus, a piece he was very fond of giving to those who came to him for a testimonial. That is one reason why I think the equal temperament now seems far more acceptable than it would possibly do in those days. Then came another question about the mixtures. Hill's partner said, Mr. Herbert had spoilt the Farm Street organ: "What do you do with the mixtures?" I said "I do not know; I suppose you tune them perfect." Will it be believed, Helmholtz in his magnificent work on Musical Acoustics talks of the infernal noise (Höllenlärm) made by the mixtures in equal temperament? Almost all the mathematical musicians, or musical mathematicians, I do not care which, seem to have gone crazy on this point. I have brought with me the most learned of all the books I know on the subject, Colonel Perronet Thompson's "Treatise on Just Intonation," and you can see for yourselves what he proposed to do to play perfectly in twenty keys. There are three manuals, not as in an organ, but simply to play in different keys. There is one point in the paper which I should like to allude to, where the writer speaks of the second of the scale. Colonel Thompson entitled that book in the first edition, "The Duplicity of the Dissonances." One dissonance was the second of the scale, and he showed that that note cannot be in tune with the dominant and subdominant both. All subdominant harmonies require the flat form of the supertonic or the minor tone, and all dominant harmonies require the major tone. Well, as I said at the time, what are you to do in a very common harmony indeed to the supertonic—namely, a $^{6}_{5}$ upon F say, followed by the common chord or the seventh on G? In that case four perfect voices would raise the supertonic one comma, you would get the two

forms of the supertonic perfectly distinct—first of all the flat form, and then the other. As to the possibility of introducing additional notes or keys to keyed instruments, Colonel Thompson's is one form. Mr. Bosanquet, whom I believe you have heard here, has invented and had built another, which is, I believe, at Oxford. A clergyman, the Rev. Henry Liston, constructed another, which was thought a good deal of; he, I think, made the changes with a pedal. Helmholtz himself has invented one; but I must ask you, gentlemen, whether, in the present state of pianoforte and organ playing, it is practicable to add notes to those already existing? To return to equal temperament, I have been at it half my life. Here is a table of intervals which I copied out fifty years ago. There are the compositions of 2, 3, and 5, really copied out of Rees's Cyclopædia, and this has been my gospel about temperament ever since. In 1852, when I had that fight with the old temperament, I drew up a table showing the errors of both systems. In the equal temperament, the third is certainly very sharp, the fifths and fourths are nearly perfect, the sixth is sharp, the minor third is very flat. Granted; but now we come to a very curious thing. There is a tendency in violin players to sharpen certain notes and to flatten others. Almost all violin players make the third and seventh sharper than the mathematical note, and in the case of flats, for example, in the key of E♭ they will make E♭ lower than D♯. It ought not to be so, but they generally do it. Dr. Pole alludes to it in that very charming book, "The Philosophy of Music," and in this equal temperament it is a singular thing that all the notes that first-rate players are inclined to make a little sharp are already a little sharp, and those notes which players, and singers too, are inclined rather to humour and make a little flat, are already a little flat. I remember the Temple organ in the old days when it had the so-called quarter-tones. Of course they were not quarter-tones, or anything of the sort; what was there was this: the key which usually represents D♯ and E♭ was divided into two, and the key which represents G♯ and A♭ was also divided into two, and one was a little higher than the other—I forget which was which. As the tuner had not got the fear of the wolf before his eyes, because on the Temple organ you could play in four flats perfectly well, he tuned the major thirds absolutely perfect, and the consequence was the diatonic scale in the good keys on the Temple organ was worse than ever, and about the worst that ever was heard. As soon as Dr. Hopkins came there he did all he could to get equal temperament introduced, and to get those quarter-tones abolished; but the old Benchers were very proud of their organ, and thought them very fine. After a time Hopkins had the organ tuned equally, but let the

quarter-tones remain, so that the good Benchers imagined they still had their old friends; but at last they were abolished, and now it is all equal together.

MR. BLAIKLEY.—I have had an opportunity of reading this paper of Mr. Habens', otherwise I should certainly not attempt to take up your time, for I think it is not one that can be considered just on the first hearing. What I should wish to say will not be in the way of criticism of this particular paper, setting forth Mr. Habens' view, for I do not think that can be profitably entered upon at such short notice; but I differ a little from Mr. Herbert, who has put the present position of equal temperament and the real idea of it before us. I think the subject brought forward should be regarded in the first place from the scientific and artistic point of view. I couple the two together, taking them as standing in opposition to the merely utilitarian point of view of the possibility of mechanical construction, or the cost of instruments, and so forth. It appears to me that when we are dealing with any matter of artistic or scientific theory we may eliminate from our consideration altogether, if we hold up the principles of art or science, practical questions of cost or mechanism; they can come afterwards and qualify the results otherwise obtained. It appears to me that to force the theory of musical intervals and harmony into an agreement with the equal tempered scale of twelve semitones is contrary to the scientific point of view, and it seems to me it is as contrary and as wrong to attempt such a forcing as it would be to force, let us say, the theory of the prismatic spectrum, or the art of painting in water or oil colours, to fit in with the number of pigments which the chromo-lithographer can practically use, and which, for the sake of analogy, we may assume to be twelve. Therefore, I think it is worth while for an Association like this to have such questions brought before it from time to time, to be viewed simply from the artistic and scientific point of view. I was a little struck (but possibly Mr. Habens' desire to keep the paper within reasonable limits may be the reason for it) with the omission of any reference to the work already done in this matter. Some instances were quoted by Mr. Herbert, and particularly Mr. Bosanquet's instrument. There is also an instrument, not so ambitious in its character, by Mr. Colin Brown, Ewing Professor at the Andersonian University, Glasgow. The distinction between the two chief systems proposed for practical work with respect to an approximation to the theory of the intervals of the scale in just intonation is, as you know, that one is cyclic, of which the division of the octave into twelve equally tempered semitones is an example; and the other system makes no attempt at dealing with keys in a cycle; of this Mr. Brown's instrument is an example. It is

now some years since he showed and explained to me his instrument, but my remembrance of it is that the volume, power, and purity of tone of the chords, due to the tuning in just intonation, was something marvellous when compared with the ordinary results obtained from a single set of reeds on the common harmonium. Of course, in cyclic systems we have to consider some practical limit of accuracy. In the system proposed by Mr. Habens, the difference known as the schisma, which is that between the equally tempered fifth and the true fifth, in the ratio of 3 to 2, is used as a unit for comparing errors. This very slight difference is not very material, as we have it on the ordinary tempered instrument. It is not material on the fifths and fourths, but the thirds and sixths are very far from being harmonious when sounded in sustained chords. I did not quite gather from Mr. Habens' paper whether the system suggested by him is a cyclic system or not; I think it is not, but simply a modification of Mr. Colin Brown's system, as it were. I would say a word with respect to what is commonly understood as the natural scale, or the scale of nature. We are commonly informed that the basis for that term is to be found in the fact that a cylindrical tube will give forth tones in harmonic succession, and a stretched string also; but we must remember that neither cylindrical tubes nor stretched strings are at all natural objects. Therefore we should have some other basis for the term, the natural scale. I think the true basis is to be found in the nature of any powerful tone. When it is resolved into its component parts they are found to be in the harmonic scale, as you all know. Now with respect to the intervals in the diatonic scale we are usually told that the semitone in the ratio of $\frac{15}{16}$ is the natural semitone. I cannot find any sufficient reason for calling that interval a natural semitone; it is no more natural than the ratio $\frac{16}{17}$ or $\frac{17}{18}$. Indeed, these two as dividing the major tone from 8 to 9 have a better title to the name of semitones than the ratio of $\frac{15}{16}$, which does not divide a tone of any kind, major or minor. Then with respect to the scale as a whole, F, the subdominant in the key of C, cannot be derived from the natural harmonic series. If we take the natural harmonic scale with vibrations in arithmetical progression from 1 upwards, it is evident that no addition or multiplication or subtraction of whole numbers can give us a number comprising a fraction such as the subdominant of the scale must include if we take the tonic as being 1, 2, 4, and so on. Therefore, the subdominant is really foreign to the natural harmonic scale. Should we not therefore rather view the diatonic scale as a combination or an interweaving for artistic purposes of elements drawn from two harmonic scales? It appears to me that that is the simplest way to build up theories concerning

the diatonic scale, and from this point of view it follows that the germ, as it were, of all transitions and modulations, either through the dominant or subdominant, is inherent in the scale as thus formed from elements chosen from two harmonic scales. Also we get that variation in the pitch of the supertonic of the D, which has been alluded to in the paper. If we have it as part of the scale of the subdominant F it is certainly a comma flatter than it is if viewed as part of the scale of C, and if we look upon the scale of C as an interweaving of the harmonic scale in C with the harmonic scale in F, by choosing elements out of each of those two scales we shall have the D in its two forms.

Mr. WESCHÉ.—It may be interesting to know that the late Dr. Sebastian Wesley always insisted on his organ being tuned in the old mean temperament. This was told me by the organ builder, Mr. Bryceson. He said that he had considerable trouble at the Victoria Rooms, Bristol, and with the Gloucester organ on that account. I have asked practical musicians that have tried these organs of Perronet Thompson, and other people, and from what I could make out the result was confusion.

Mr. HERBERT.—Did Dr. Wesley never come round to equal temperament?

Mr. WESCHÉ.—No.

Mr. HERBERT.—I thought as much. I may perhaps say one word more that occurred to me. Does anyone believe that in an orchestra where there are ten or twelve first fiddles, and all the rest in proportion, all these mathematical intervals are used—or in a chorus? The thing is simply impossible. It is all very interesting, but, as applied to keyed instruments, of no practical use. Four voices, if they are very well trained, may, and possibly do, sing mathematically correct. It is quite possible to write a melody or a harmony of such a nature that if the intervals are sung perfectly correctly the singers are bound to rise or to fall. If the melody or harmony has a preponderance of ascending fifths or descending fourths they will rise, and if it have a preponderance of descending fifths and ascending fourths they will fall. But they do not fall if they sing well. The Leeds singers did not fall, and the Bach Choir at the last Concert sang an unaccompanied Motet of Bach's and they did not fall. Then comes the question—how do good singers and good players temper themselves; how do they prevent this falling? At Farm Street every year during Lent we had to sing what are called Lamentations, which is done entirely without accompaniment by single voices, and the Cantor—a most excellent singer—and I used to take them alternately. He could not make out how it was that he used to sink and I did not. I told him he always took the second of the scale too flat. If you take the

second of the scale always in the sharp form you can keep up.

Mr. Blaikley.—I should like to add with reference to the remark about just temperament in an orchestra, that I believe, as a matter of fact, we do get much nearer just intonation than we do to equal temperament in the orchestra. I cannot speak with respect to stringed instruments from any special knowledge, but with respect to wind instruments they are so much under the power of the lip that the slight difference of a comma can easily be made, and I should imagine that if a tonic and dominant were played, and the flute or clarinet player had to put in the third to complete the chord, he would naturally put it in just intonation; in fact, he could not hold it in tempered intonation.

Mr. Wesché.—There are constantly intervals written quite incorrectly for instruments in the orchestra on the old mean temperament.

Mr. Herbert.—Do you know, by the way, that Wheatstone's concertina for twelve or fifteen years has been tuned equally? When Wheatstone brought it out he told me it was perfect in 6 keys. Some years ago I had to choose a concertina for a friend by Wheatstone, and to my astonishment I found it was tuned equally. They have the two keys for D♯ and E♭, and G♯ and A♭, but they give the same note. I suppose they found they could not play with the pianoforte. Giulio Regondi, who was the finest concertina player, had two always, one for the orchestra and one for the piano.

Mr. Webb.—I made some experiments once with my piano with regard to tuning, and can bear out Mr. Blaikley's assertions. I tuned two octaves in the key of C perfect, and certainly the perfect fifths and thirds had a delightfully satisfying effect; but, of course, the other keys went to smash. I think one thing we have lost sight of is, that although we have more or less imperfect instruments, and out of tune, on the other side the ear accommodates itself and compensates very much for it. If we have it not, the ear in many cases practically approaches perfect intonation.

Miss Prescott.—The whole theory of modulation and enharmonic change is founded on that principle, that the ear accepts what it wants and not what it gets.

December 2, 1889.

W. H. CUMMINGS, Esq., Vice-President,

In the Chair.

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THE CHARACTER AND INFLUENCE OF THE LATE SIR FREDERICK OUSELEY.

By Sir John Stainer, M.A., Mus. Doc., President of the Association.

Though not one of that class of musicians about whom the public talks with feverish excitement, and though his ways and words were not the object of journalistic curiosity, Frederick Arthur Gore Ouseley was a man of wide influence, and one whose character and labours deserve careful study. He was distinctively a representative man, and in furthering the objects he had in view in life he was uniformly consistent, as indeed every man must be who conscientiously draws up a scheme of work founded on a sense of duty, and turns neither to the right nor left while pursuing it. Whether he chose the best scheme of life or not, we shall by-and-bye try to discover; but the simplicity of his mind, the purity of his motives, the calm persistence with which he aimed at his object, and his immense self-sacrifice in securing it, seem to point more to the chivalrous knight of a bygone age than to the modern worldly artist, who rapidly faces about this way or that way, but who, somehow or other, is always found treading the path which leads to the best market for his wares.

Ouseley was not of this type, he never thought of self except as something to be suppressed in order to realize the cause he had at heart. As you all know, his object in life was to revive English Church music, and re-establish it on the model of a past, and, what he thought, a better style. He certainly seemed to have at his command all that could be needed for the purpose; born in 1825 of an ancient family whose name never is found but in connection with some high sphere, often in the diplomatic service or in the Indian army,

he was the godchild of Frederick, Duke of York and Albany, Arthur, Duke of Wellington, Frances, Marchioness of Salisbury, and his eldest sister, Mary Jane Ouseley. At the time he was born his two sisters were young women, who tended and watched him with motherly care. They soon found that the unexpected heir to the estates and baronetcy was a child of no common order, quick and bright in every way, but gifted in a marked degree with a talent for music. As soon as he knew his notes, which was when only two or three years old, he showed delight in constructing chords on the pianoforte, and he surprised everyone by his power of naming the sounds of whistles and other noises; and he once told his sisters the exact name and pitch of a clap of thunder. On another occasion he quite frightened an unmusical nurse by telling her that a clock had just struck in the key of B flat minor. This sense of absolute pitch never deserted him: when quite a small boy a work by Mendelssohn was produced at a concert in London at which he and J. Cramer were present; Cramer was heard to say that the slow movement was in a particular key, little Ouseley said it was in another, and named it; the child proved to be right, Cramer wrong.

The Rev. J. Hampton, now Warden of St. Michael's, one of Ouseley's oldest friends, sends me this anecdote. In the winter of 1850 Ouseley went abroad for six months; on his return he went to St. Paul's and, as was his custom, went up to the organ loft. Goss asked him to sing C of the organ; Sir Frederick, without hesitation, sang B, which Goss put down. Sir Frederick said immediately, "You have had the organ raised a semitone," which was true. During the six months he had been abroad he had played on more than a hundred organs of different pitches, in Spain, Italy, Switzerland, Germany, and France.

Mr. Hampton received this anecdote from the late Sir John Goss himself.

Within the last few years, whilst chanting the service at St. Michael's College, an accident happened to the mechanism of the organ, and it became necessary to fetch a harmonium during the prayer for the Church militant. On seeing it brought in he remembered that it was a different pitch to the organ, and he gradually modulated his voice towards the end of the prayer with such a nicety that when the organist played the Amen on the harmonium it was perfectly in tune.

You will find many most interesting facts about his childhood in a short memoir now being published by Messrs. Jakeman and Carver, Hereford, which contains a truly lifelike portrait. Canon Havergal very kindly sent me the early sheets to read, but I thought it unfair to make use of them to any great extent.

As soon as his hand had reached a sufficient size he

began to construct little tunes, which he played over to his sister and she wrote down.

Owing to the kindness of Mr. Hampton, his old friend, who succeeded him as Warden of St. Michael's, I am able to show you to-day a little MS. book containing two hundred and forty-three little pieces composed during his childhood; the first when he was three years and three months old, the last when he was eleven years of age. I have gone very carefully through this interesting volume and, from the natural and easy way in which all the chords would fall under a tiny hand, there can be no doubt his sister succeeded in writing down exactly what he played and as he played.

As might be expected, they consist chiefly of short dance tunes, not longer than sixteen or twenty-four bars. I will play you the first, composed, as I said, at the age of three years and three months:—

Nov. 18, 1828. Three years and three months old.

You shall now hear one written when just over five years of age; it is a distinct proof of progress (No. 72).

(This was played.)

One written at the age of seven is very interesting as an attempt at a tone-picture. It represents, in a childlike way, "Beginning to be ill," "Now I'm very ill," &c., the state to

be described being written between the lines of music (No. 207). I will now play it—

March 22, 1832. Aged six years and seven months.


Iller than ever.
rall.
Blisters
rall.
a little better.


8va
Not quite well yet.
8va
8va

If you will allow me, I will play one more extract from the book, it is called an *Andante con espressione*, and is certainly an excellent piece of writing for a child ten years of age (No. 239)—

(This was played.)

I cannot help thinking that a sound musical training would have been a greater benefit to him than the prescribed classical course of a University. But about this I must speak later on. Of course, Ouseley was a great favourite, and was the centre of a very musical set of undergraduates at Christ Church. Most of you know the splendid staircase leading to the dining hall; it has remarkable acoustic properties, a chord sung clearly will often continue to vibrate for a few seconds, therefore to stand by the central pillar and shout an arpeggio was a favourite pastime of the men; but Ouseley completely beat all competitors at this fun because, owing to his use of falsetto, he could produce an arpeggio nearly three octaves in compass.

I have heard him tell how he and some friends determined to produce a novel effect during a concert at the Town Hall, under the direction of old Dr. Stephen Elvey.

They managed during the day to secrete under the platform a number of metal coal-scuttles, sponging baths, and other novel noise producers, and being safely hidden amongst the timbers, armed with hammers, drumsticks, and other weapons, they patiently awaited the performance of Mendelssohn's "Wedding March." . . . At last it was reached, and in all the *fortissimo* passages these unwonted instruments of percussion thundered away to the infinite astonishment of the Conductor. At its close Ouseley and his friends were anxious to crawl out of their dark and stifling quarters and escape, but much to their disgust the audience, unaware of the cause of the new effects, encored it enthusiastically.

While Ouseley was an undergraduate, Dr. Marshall, the organist of Christ Church, was succeeded by Dr. Corfe, a son of the venerable organist of Salisbury. Being a musician of the old type, Dr. Corfe rarely changed his stops during the Psalms; Ouseley and his young friends got so accustomed to one particular quality of tone that they named it the Corfe-mixture. Ouseley knew that Dr. Corfe always at the close of one service prepared his stops for the giving out of the chant at the next; moreover, Dr. Corfe was fond of long walks, and made a point of rushing into the organ loft just in time to place his hands on the keys. This offered a temptation to the undergraduates which was irresistible. Watching Corfe safely out of the Cathedral one morning, Ouseley put in all the pre-arranged stops, and then drew on each manual the most horrible and startling combination he could think of. When evening service commenced, Ouseley and his friends stood behind a pillar to hear the effect. Sure enough, just as the Psalms approached, Dr. Corfe hurried in and placed his hands on the keys. Everybody in the church gave a start, *except Dr. Corfe himself*, who placidly held down the chord while he one by one put in the objectionable registers, and gradually drawing his usual stops once more reverted to the inevitable "Corfe-mixture." Ouseley's acquaintance with Corfe ripened into a staunch life-long friendship.

Ouseley succeeded to his father's title in 1844, that is, at the age of nineteen. The fresh responsibilities this involved compelled him to give up all idea of reading for honours, so he took his B.A. degree in 1846, receiving what was then known as an Honorary Fourth in mathematics. He then entered Holy Orders, and became one of the curates of St. Barnabas Church, Pimlico. This step influenced and practically determined the whole future course of his life. It was during the short period of his diaconate that he formed the project of devoting himself and his means to the encouragement and nurture of Church music. In 1850 he

became a Bachelor of Music of Oxford. In 1853 he published a collection of Cathedral Services and Anthems. I must pause to say a word about this work. If the motto "de mortuis nil nisi bonum" were to be strictly enforced, I am afraid all history would collapse. So I make no apology for saying plainly that the publication of this volume was premature and ill-advised. It contained but little which has survived, and in the main it gave a very false impression of the powers its author really possessed. It was specially unfortunate that it should have appeared only a short time before he was appointed Oxford Professor; because, when he succeeded Sir Henry Bishop in 1855, there was a considerable amount of dissatisfaction amongst musicians that this "blue ribbon" of the profession should have fallen into the hands of a young amateur.

In those days the post was only an annual appointment on the nomination of the two Proctors, though of course renewable every year, and musical degrees were practically given on the sole responsibility of the Professor. But after Ouseley was appointed, a Statute was passed vesting the election of Professor in an influential and representative body in the University, and constituting public examinations by three examiners as a necessary step to degrees. Twenty years later —namely, in 1876, the system of granting musical degrees was brought still more into accordance with the use and customs of a University by the addition of preliminary examinations in arts. Though these statutes raised the value of the degrees from a general point of view, I am afraid they have had an effect not at all contemplated when they were passed. It is quite unreasonable to expect a professional musician, say forty or fifty years of age, to go in for "Smalls" or to sit at a "Local Examination," hence many experienced and able musicians are now deprived of an honour which used formerly to be within their reach; and worse still, it has encouraged the mushroom growth of all sorts of diplomas and hoods, and the importation on a large scale of degrees from Canada and the United States.

It was soon after Ouseley's appointment as Professor that he came to examine the chorister boys of St. Paul's, of whom I was one. I shall never forget the nervousness with which I approached this musical and clerical dignitary when summoned to meet him in the drawing-room of our master, the Rev. J. H. Coward. But I played a Prelude and Fugue by Bach, from the "forty-eight," by memory, and, at its conclusion, Sir Frederick gave me a few words of good advice and much kindly encouragement.

How little could he have dreamt that he was patting his successor on the head!

The next interview I had with him was full of moment to

me; it constituted a turning-point in my life. I was then between sixteen and seventeen years of age, and was playing the afternoon service at St. Paul's, both Goss and Cooper being absent for a few days. During the service Ouseley came quickly into the organ loft and, after greeting me, watched me closely as I accompanied the music from the old "scores." On the same evening I had a letter from him to say that the object of his visit to St. Paul's had been to find an organist for St. Michael's College, and he offered me the post. I must apologise for thus introducing myself into this paper, but it explains why and how I come to know so much about the character and abilities of my patron and friend. In 1857 I found myself, after a railway journey to Worcester and then twenty miles on the top of a coach, settled in the charming building which he had raised at his own cost for the advancement of church music. From it a short cloister led into a church of beautiful design, rich in carved wood-work and stained glass, containing a fine organ, and served by an admirable choir. Here, day by day, choral services of a high standard of excellence were maintained.

In these utilitarian days it would seem to many a great waste of resources that splendid musical services should regularly take place on week-days in a church, with no congregation to participate in them or enjoy them. But Ouseley never viewed it in this light. The services, he said, were for the glory of God, and the offering would be none the less acceptable to Him because it came from an out-of-the-way spot in a remote country district.

The life in St. Michael's seemed, at first, primitive and mediæval. All of us had meals in the large dining-hall, Sir F. Ouseley and his staff occupying seats at a high table, the boys in the body of the hall. After morning service the boys settled down to their school-work, in the afternoon they came to me for lessons on the pianoforte. After evening service and a meal in the hall, I studied or practised, or, as was frequently the case, was invited by Sir Frederick to pass the evening with him. In the splendid musical library he had collected there was a rich store of pure vocal masses of the Italian school in MS. in the old clefs, including not only the soprano and alto, but often also the now obsolete mezzo-soprano and baritone clefs. At that time he had not found opportunities of going carefully through these, and, most fortunately for me, I was asked constantly to play them through to him, he turning over, and from time to time making critical remarks. I gained much from this almost unique chance of studying the vocal writers from, say, 1550 to 1700. Sometimes he would prefer amusing himself in the evening by writing a canon, or some other equally ingenious *morceau.*

I have, I am glad to say, preserved a considerable number of these, and I have brought them here to-day for you to see and examine.

Here is a *Gloria Patri* in canon, 4 in 2 at the under 5th and 8th.

Another is 3 in 1 at the under 7th and 8th, a most troublesome thing to construct.

On the back of one of these slips I find an ingenious little canon sixteen bars in length, in three parts; the second part answering the first by inversion, while the third part is the first part by augmentation.

One page of MS. contains four ingenious canons which evidently gave him as much amusement as trouble to construct: the first is 3 in 1 at the under 5th and 11th; the second, 4 in 1 at the under 6th, 11th, and 16th; the third, 3 in 1 at the under 17th and 19th by inversion; the last is 3 in 1 by double augmentation.

At the bottom of the page he wrote "A page of the driest possible music to console those who suffer from the effects of moist weather."

It is quite true that they are dry, musically, but as specimens of his skill and patience they are most valuable. When he had brought a difficult canon to a successful issue, he used to burst out laughing and clap his hands for joy like a child. He has also written across the top of the canons I have just described: "Heavy artillery discharged on the night of Dec. 20th, being St. Thomas's Eve, in defence of a fortress closely besieged by envy and malice, and garrisoned by ye Oxford Professor." Along the side he wrote: "The notes on this page were made to establish the reputation of our Cathedral dignitaries by one of their own body, who hopes to put cavillers to flight—*i.e.*, qui inimicos *fugare* sperat," which of course might mean "hopes to make his cavillers write fugues."

On another page will be found a canon, 3 in 1 by inversion, over a given *canto fermo;* and over the same bars a canon, 2 in 1, at the under seventh.

Here is a canon 4 in 1, each part following its predecessor at the 5th—*i.e.*, D is answered by G, G by C, C by F, and so on. This process is reversed in the next canon on the same page.

I find a canon, 4 in 1 at the 4th below, "ascending by tones eternally." This extends to thirty-nine bars. Amongst all these specimens of the way we passed some of our evenings together, I have here a single chant in eight parts, which he thus describes: "This, if sung alternately Decani and Cantoris, will make a double chant in four parts; either half may form the commencement, so it may be said to contain two double chants. Either half singly will form a single

chant, so it may be said to consist of two single chants. Lastly, the whole may be sung concurrently, when it will make a grand single chant in eight real parts.—F. A. G. O."

To me one of the most interesting of these autographs is a clever arrangement of Bach's first Prelude from the "forty-eight" for the guitar, under which he has written "ad usum amici Johannis Stainer aptatum præludium hoc, quo melius quantum organis tantum etiam citharâ præter omnes emicaret D.D.D. amicus citharæda Michaelensis." He had just made me a present of a guitar, at which I was working assiduously. He was a capital player on the guitar, and also on the obsolete harp-lute, and often used to pass the evening singing Italian or Spanish national songs to his own accompaniment, always with admirable skill and good taste. He played the violoncello fairly well, the organ excellently. But his real gifts were shown when he extemporised, quite privately to a friend or two, on the pianoforte. I particularly remember one occasion when he and I were alone in his drawing-room. I was not very well and was lying on the sofa; he offered to extemporise, and sitting down at the pianoforte he played a complete Sonata in four movements, each movement in perfect form, full of invention, rich in melody, and novel harmonic combinations. Fearing to break the thread of his improvisation, I abstained from speaking until he had finished, which he did in the course of twenty-five minutes or half-an-hour.

Yet when this talented man took up his pen to *write* a composition it seemed as if some evil genius stood by to damp his invention and wreck his originality. I have not the least doubt that a proper course of early training in the *technique* of composition would have given him such facility in putting his thoughts on paper as would have made him one of our foremost musicians. I find that all his intimate friends are of the same opinion. He wrote but little secular music, but what he did write was melodious and smooth. I should like you now to hear two songs and a glee which will, I think, interest you. They are not dated, but I believe they were written at various times after he left Oxford, say from 1848-58.—Song, "Zephyr, should'st thou chance to rove"; song, "How beautiful is day"; glee, "Gem of the crimson-coloured even."—Owing to the kindness of the Rev. T. Littleton Wheeler, I am able to let you hear a "Song without words" (in E minor), one of six written between the years 1839 to 1849.

(These were sung and played.)

Although I have not attempted to-day to give a biography of my late friend, you have probably by this time formed your own opinions on the "character and influence" of F. A. G. Ouseley. As a man, his life was irreproachable, his example noble; in the sphere of historical knowledge of his

art probably no contemporary surpassed him; but as a composer, it is impossible not to feel that he ought to have secured a higher position than he did.

This disappointing fact must be ascribed partly to the neglect of that technical training which even a genius cannot dispense with, partly to what I conceive to be the false historical view which he formed of music, especially of church music. For this false view Dr. Crotch must be blamed. Ouseley thoroughly imbibed the spirit of Crotch's "Lectures." In these Crotch traces the history of music as if analogous to the arts of painting and architecture. Other arts, he argues, have reached a culminating point of excellence, and then have gone into decadence; therefore, the art of music is in a similar condition. As a sequel, students are advised to *imitate* the compositions of the so-called "best period" of style. Crotch was an ardent admirer of Sir Joshua Reynolds' "Discourses," and his Oxford lectures are simply larded with quotations from Sir Joshua. If you will take the trouble to read pp. 196 to 202 or 203 of the Discourses (1778 Ed.) you will find the gist of Crotch's advice to young composers.

But there is this important distinction between Reynolds and Crotch.

In Sir Joshua's advice to students to imitate the old masters you will always find he guards himself against a reactionary limitation of the scope of art. Not so Crotch in his lectures: he, an infant prodigy just as remarkable as Ouseley, managed to ruin his career as a musician by his blind imitation of the past; and I fear it must be said he too truly succeeded in helping to mar the splendid future which Ouseley's early life distinctly promised.

I know no more sad example of the fallacy of the argument by analogy than this creed of Crotch—that music had seen its best days. If you remember that Crotch began to lecture publicly in 1801, or thereabouts, you will at once see what a very false prophet he has proved to be.

We musicians are not yet called upon to retrace our steps, for our many-sided and wonderful art seems again and again to burst out afresh and find new room for vigorous growth. Of course, imitation of the past in music is a necessary process of pupilage; but, to look upon it as an end in itself, is surely destructive to all progress and expansion. The imitator is, after all, no better than a mere mechanic; the ultimate function of the true artist is not to imitate the old, but to create the new. In order to do so, he must, indeed, tread old paths, but not for the purpose of loitering in them, only in order to trace them up to the very front of the present. There is one insidious temptation which often draws gifted men into the ranks of mere imitators; it is this: the general

ruck of mankind will always prefer an imitation to an attempt at novelty, for the very obvious reason that the public finds it easy to criticise an imitation, whereas only a select and cultured few are capable of gauging the true merits of what is unfamiliar.

Had the lot of Ouseley been cast thirty or forty years later, he might have fallen among better advisers and his career might have been most brilliant. Whether he ever suspected that he could or should have attained a higher level as a composer I dare not say; but the views he expressed about musical criticism and history did not vary to the day of his death. The last time but one that he appeared in Oxford he stayed in my own home, and though he knew that the condition of his health was critical, owing to disease of the heart, I never saw him more cheerful or happy in his simple, childlike way. The information of his death reached me whilst I was in Biarritz, too late to enable me, even by the quickest route, to get back to St. Michael's and be present at his funeral. But I offer to-day these few words of respect and esteem for him as a sort of wreath upon his grave. Each of us will indeed be fortunate as, one by one, we sink down and fall out of the living crowd of hurrying, elbowing humanity, if we shall leave behind us such a sweet memory for amiability, learning, and self-devotion as did Frederick Arthur Gore Ouseley.

DISCUSSION.

THE CHAIRMAN.—Ladies and gentlemen, we have a very pleasant duty to perform, and one particularly agreeable on this occasion, assembled as we are to greet the successor of our late lamented friend. Probably there are many of us in the room who had not only an acquaintance with Sir Frederick Ouseley, but something more than that—personal intimacy and friendship with him; and I am sure to those it has been extremely agreeable to hear the pleasant, kindly, and able words which have fallen from Sir John Stainer on this occasion. Sir Frederick Ouseley we knew well, and those who knew him best knew what a noble, what a great man he was; for his whole life was one continual effort to do good for others, and particularly for our own musical art. If he did not succeed as he intended, and as he wished (and he certainly did not in some respects), it was probably for the reasons which Sir John Stainer has so ably stated. As far as I know, it is the first time that anybody has ever mentioned why Sir Frederick Ouseley and Dr. Crotch—

two very great men, and who had been most extraordinary as children—neither of them achieved anything like the greatness they ought to have achieved considering the early promise they gave. However, I will not detain you any further, but only propose a vote of thanks, which I am sure you will give very heartily and unanimously, to Sir John Stainer, for attending on this occasion, and for having given us this very delightful lecture.

The resolution was passed unanimously.

Sir John Stainer.—I am much obliged to you, gentlemen. It has not been altogether without a little touch of sadness, although with a certain amount of pleasure, that I have come here to speak about my late friend.

JANUARY 6, 1890.

H. C. BANISTER, ESQ.,

IN THE CHAIR.

SOME THOUGHTS ABOUT SINGING.

BY FREDERIC PENNA.

WHEN it was intimated to me that I might be invited to read a paper at one of the meetings of the Musical Association, I hesitated for a moment, should the invitation come, feeling doubtful whether it was in my power to say anything that would not be as well, or better, said by any one of its members.

But as our art has several branches, I thought on reflection I might briefly treat of two or three phases of that particular branch to which some of the best years of my life have been devoted.

With much pleasure, therefore, I accepted the invitation kindly forwarded to me by your Assistant-Secretary.

The subject of my paper I call "Some Thoughts about Singing," with reference to accent, to certain vowel-sounds and consonants, especially the vowel-consonant—the letter "R"—whether and why English vocal students should go to Italy; and, finally, about the production and the placing of the voice.

The records and the traditions of the vocal doings of some of the English and Italian artists who flourished here during the early portion of the present century go to show that singing, as an art, was much more seriously and sternly cultivated then than it is in the present day. The right production, placing, and cultivation of the voice was regarded as the first and the essential thing, for it was justly held to be the making of the instrument which had to be subsequently used in singing. This production and placing of the voice included then, as it should now, all that pertains to the art of breathing, and to the just employment of the various organs associated in the performance of the functions of the voice.

But I must not anticipate what I propose to myself as the last point upon which I desire to speak in the present paper.

I must ask those of the members of the Association who may be as fully acquainted as I am with the headings of my

subject, to bear with me while I briefly unfold some of my views—not formed hastily or reflected by fancy—which I trust will be found to be in the line of truth (though they are called "thoughts," and are not an exhaustive treatise on any portion of this "beautiful art").

In speaking first upon accent in vocal music, I find there are too many instances in the past and present of song to justify the conclusion that, in the opinion of some writers, accent is but a very secondary consideration. I do not limit this thought to the less pretentious examples of vocal music, I speak of the comparative indifference, as it seems, on the part of some musical writers, as to whether the quality of the poetry they have to set is worthy the search after poetical emphasis. It is true, musicians do not, as a rule, set their melodies to the works of the great poets, and the "rhyming thoughts" of the present day are regarded but as pegs on which to hang melodies. The evil is, that the singer is unconsciously taught to be more or less indifferent to what ought to be a great power; for poetry (the outpouring of the heart of the poet-born), recited or sung, depends for its very life upon a just and full appreciation of the words and their right accent, by him who renders it. But the accent to be well enforced, the sentiment must be nobly wedded to a melody, or melodic inflections, in thorough sympathy with it.

Notes bearing musical accent should never be set to unimportant and unaccented words or syllables, words of a simply connecting character. If circumstances arise making it hard to avoid this, the difficulty may be partially overcome by an expedient. The artistic singer is justified in requiring this. Speaking generally, all notes partaking of the nature of dissonance should be allied to the more important words. In the diatonic scale, for instance, the second, the fourth, the seventh, resolving on the notes of the common chord, should be set, where possible, to the emphatic words or syllables. All words (which good elocutionists would strongly accent) should be set to these or other notes of a dissonant character, such as appear in the various chords of the seventh, ninth, eleventh, and thirteenth. This gives the intellectual singer the chance that is his due. All intelligent singers study their words, and the very letters of which they are composed, and they are never pleased to find articles, prepositions, or conjunctions falling upon notes bearing primary or secondary musical accent.

That composers generally were not very particular in this respect at the time of Handel may be inferred from the fact that Handel himself did not regard it. But it will be rightly said, Handel, though an Englishman in heart and feeling, was not a master of the beauties and niceties of the English language; or perhaps he did not rightly estimate the great

value of verbal accent, otherwise he would not have given such force to the conjunction "than" in that otherwise splendid song, "O ruddier than the cherry." Most of his songs and arias will give evidence of this. I content myself with referring to one recitative, "Thus saith the Lord, the Lord of Hosts," from "The Messiah." The word "of" set in the dominant in an ascending passage of three notes from the third, is a departure from what one feels to be right from a singer's point of view. The late Sir George Smart, who had a very keen ear and mind for accent, and was laden with traditions, invariably made such offending notes very short by dotting the preceding note. This expedient partially removed the offence. But when the purists began to exert their influence, they, by their criticisms, caused vocalists to sing all their notes according to the length and accent given to them by the classical composers, and Handel, of course, was not allowed to be touched. Thus words and their just accents were ignored in the endeavour to present the musical composer with whatever inaccuracies he left behind him. Handel himself, it is on record, allowed his singers, in whom he confided, to make such changes as their good taste dictated, and the great singers who flourished sixty or eighty years ago, such as Mrs. Billington, Mrs. Salmon, the great Braham, and others, made occasional changes and introduced graceful ornamentations, some possibly handed down from the master's time; but in later days no one had the courage to do such things. Why, one might ask? Crivelli, in his great work upon singing, has some valuable arguments in favour of this permission. I have copies of some of Handel's songs marked with slight alterations by Sir George Smart (traditional, I believe), at the time of my being a pupil of his. But now, and for some time past, singers have not deviated from the "black letter" of the text, fearing, I suppose, the reproaches of the purists. The consequence of this is, the intellectual singer has to subject his appreciation of accent to a prejudice that has little to support it but a blind faith in the rectitude of leaving things just as they were found.

In the recitative referred to, "Thus saith the Lord," the word "little" in the phrase, "yet once a little while," as regards its second syllable, is sung to an offending "D" in its connection.

The terminal words of this recitative are important and potent: "Saith the Lord of Hosts"; and with my mind impressed with the laws of accent I submit whether, if Handel had known the English language better, or it had not been too much the custom to be indifferent to verbal accent, he would not have preferred some other musical ending. For the words "Lord of Hosts," Handel gives, as you all know, the leading note, the tonic, and the dominant. With

this close several recitatives in "The Messiah" terminate; some of these may suit the accent of the words to which they are set, but not this instance; the rise to the tonic for the preposition "of" is always jarring. It can hardly be argued that this particular form of close is necessary, or that words of varied import do not require musical phrases suitable to themselves. I urge this from a singer's point of view.

The pupils of the late Sir George Smart, who had the tradition of how Handel's songs and recitatives were sung probably from the time of the great master himself, through Mr. Bates, whom Sir George knew when he was a boy, and who himself was a boy in Handel's time, will be sensible what efforts he always made to equalize and rightly adjust the accents that seemed to war against the sense of fitness. It was for this reason that Sir Michael Costa always advised students to go to Sir George when they desired to be singers of Handel's songs. Sir Michael was one who regarded accent as the life and soul and excellence of singing.

Now the operatic music of Bellini, Donizetti, and Verdi, especially the last-named, has much of its power from the fact that the absolute and relative accents of the sentiments expressed are, generally speaking, in perfect accord with the accents of the melodic inflections. Those who remember Giulia Grisi in "Norma" are not likely to forget her accents, and I think I am right in saying that Costa helped her to the consideration of some of these.

For the singer's sake, and for the vocal art, ought we not to expect the same perfection of united accent in the songs and *arias* of this country? Many indeed are the flagrant instances of false accentuation to be found in the "thousand and three" publications issued to amateurs every month.

Next as to vowels. It has always been held that the beauty of a voice is to be found in the sound of the vowels. The utmost attention then should be given that the vowels be rendered with the rarest purity and the utmost correctness. Every vowel having two, three, or more separate shades of sound, there are necessarily some eighteen or twenty in all that have to be attended to. Now in various provinces in England, some of these vowel-sounds differ from the sounds the same vowels have among the most educated speakers in London, and, I suppose I ought to say, the great seats of learning; and as the perfection of these should be aimed at, I shall be but uttering your own opinions if I say this perfection should be the standard of correctness for the singer. All his vowel-sounds, from whatever province or country he come, should be in accordance with this standard. Now several of these vowels are diphthongal; how, in these cases, should the phases of sound be distributed? The answer is—the singer must make his musical note always on the first

sound of his vowel (even if he have many notes to sing to it), and dispose of his second vowel-sound as quickly as possible, and thus make the musical part of his vowel resemble the Italian vowel. This requires a little practice, but his word will be the better understood.

But how is this purity of the first part of the diphthongal vowel to be secured? It is simply by keeping the organs of speech rigid, in one and the same position (the slightest movement alters the sound); the second sound, making up the diphthong, will come, as it were, of itself, by simply allowing the lips to relax themselves, or raising the lower jaw. Example: Pain, brave, bright.

Those who have not had their attention given to this particular will be surprised to find how soon the end is attained by the adoption of the means, and how much more tuneful and musical their notes will be.

This purity of vowel is what ought to be observed, that the singing of the present may be more like the singing of the best days of the art.

It is to be feared tastes are cultivated in too many musical directions, and in the schooling of the day there is such "express" anxiety to go from subject to subject, that the necessary devotion to one can be but rarely seen, and when seen, surprised at, as a thing out of time and out of date.

One word more before going to consonants. Most of the songs and ballads of the day (which usually whirl into a dance before closing) have for their main topic, love. Now it is unfortunate that the word love should have to be so many times repeated, as its vowel-sound is difficult (while in the Italian it is easy and beautiful, *amore*), and pupils, I find, are sometimes taught to give the first part of the vowel a sound foreign to itself. If the word *love* began with "s" instead of with "l," as pupils I speak of sing it, it would be *salve*. A heart that loves finds a *salve* for the wound when the love is returned, but I do not think, even then, that the two pronunciations should be united.

Whatever difficulty English vowels possess, that difficulty is overcome by the orator and good elocutionist, and it ought to be mastered by the singer, whose art-work rests no more upon the perfection of his intonation than upon the purity of his vowel-sounds.

In what I have said will be seen the reason of my thinking mistakes are made in vocal exercise books, which seem to insist upon the open vowel "a" (as in father) being made to bear the whole weight and burden of the vocal student's art-work. Until the voice is placed this may be well, but afterwards the "a," as in father, should have no more than its just share with the rest. The "a" in words such as rain is the one giving students the greatest trouble.

Now as to consonants. But little need be said with respect to them in general. Elocutionists divide them into two classes which they call aspirate and vocal, these again they sub-divide into explosives and sustained. I pass over the former of these two classes, with the caution that the distinction between the letters of the two classes, which somewhat resemble each other, should be carefully observed to prevent confusion. As to the vocal-sustained consonants, the word "sustained" will suggest that something may be had out of them beyond the mere germs of expression. The letters l, m, n, r, f, v, s, and some of the combinations, will serve the singer well who seeks the aid they can afford him. It is more than tradition, it is history, that the great tenor, Braham, got effects from them quite sensational. His words in recitative, in dignified utterance, in expressions of sorrow, when singing in "The Messiah," in "Jephthah," and in other works, were so delivered that the effect produced upon his enraptured and enthralled listeners was an abiding power, and it was through these consonants.

In singing the sacred name, Lord or God, he seemed to introduce, I am told, an aspirate after the initial letter, which gave an emotional sublimity to the word to which ordinary expression never attained.

This has come down to us from those who knew him well, and who, like the rest of his many admirers, of whom the present Mr. Gladstone, himself a musical amateur of great discernment and taste, was one (and who in those days was not ?), were powerless in his hands and subject to the spell of his superb genius.

My recommendation, then, to the aspirants of vocal fame would be to think well of the vocal-sustained consonants, and get all possible expression out of them, and thus let singing be distinguished from mere warbling.

Before passing to the question next proposed, whether students should go to Italy to learn singing, and if so, why? I wish to say something concerning the vowel-consonant "r." Now this is a letter giving great trouble to many singers for want of a recognition of definite rules when it should make itself heard and when it should be silent. The rules I am about to give were, I have been told, observed by the great actors who flourished sixty or eighty years ago, and they were regarded by Macready, and I think they embrace every possible case. When "r" follows another consonant it should make itself heard, whenever it precedes another consonant it should be silent. This is simple enough. [Break, bring, brass, crush, drive, fret, grieve, prayer, praise, are examples of the one; bars, bird, card, chord, earth, Lord, word, are examples of the other.]

When it ends a word, or when it terminates a word with

the vowel "e," it should be silent [rare, before]. When it ends a syllable, if the next syllable begin with a consonant, it should be silent [ex. purpose]; but if this second begin with a vowel it should be rolled [bearer]. If it terminate a word immediately followed by another word beginning with a vowel [father and mother of this boy], let it be heard; but if there be the slightest pause for effect or grammar's sake let it be silent, it will have done its office. Also, if in a word of two syllables both syllables end in "r" and a vowel begin the next word, the "r" at the end of this first word should not be sounded. [Ex. "To hold the mirror up to Nature"; "an error of mine."]

This not sounding of the "r" at the end of a word leaves the singer able to terminate his note (if the word end a phrase, or be followed by a rest) with the mouth open, which is greatly to his advantage.

I am by this consideration brought face to face with the question—Why do vocal students go to Italy? Is it because the air is softer there, and better for the larynx, the glottis, and the muscles of the throat? If that be the reason, they ought to have been there during the growth of these organs. Or, if this improvement be only while the student remains in Italy, the return to this harder climate would be prejudicial rather than otherwise to him. Indeed, lapsing into his former state would probably occasion mental depression besides. But it cannot be this, otherwise the great Italian artists who came to this country annually years ago for the opera would never have been able to go through their arduous work, which they did to their own satisfaction and the delight of the *habitués*. Trying to account for it in another way, it may be that better artists, as masters, are supposed to reside there. This might have been the fact once. It cannot be so now, for the facilities for coming to this country by railway through the mountain tunnels enable Italian masters to find their way hither in large numbers. And they do come, whether they are masters or simply Italians.

The prejudice existing in this country is too well-known everywhere—that anything Italian is superior to anything English, excepting, perhaps, hot-house fruit and English roast beef. Well then, if not for the air or the masters, is it that the Italian ear is supposed to be more correct than the English ear, and that perfect intonation is catching, and that this true intonation is heard in every street and every corner of the street? No, not for this; for I have heard more out-of-tune singing at night in the streets of *Milano* than in London. But this I will say, that the exuberance venting itself in song was not the result of alcoholic intoxication, but it was the result of cheerful, not ardent spirits.

The one great reason, excepting perhaps for the traditions

of the real Italian operas, is in the language; for with an exception or two all the words end in vowels, and every vowel has but one sound in the same syllable; as the vowel begins so it ends; and while it continues the organs of speech should undergo no alteration of position. They should be rigid. Thus the truthfulness of tone is preserved; assuming the note to be correctly struck, the ear not deficient, and the organs of speech normal, the word is left off with the mouth open.

The consequence of this is that the voice travels and vibrates, and is in effect different from the voice of the Englishman, who has never sung anything but his own language, and naturally closes his mouth. But do all the masters of singing in Italy direct attention to the beauty and the correctness of singing Italian vowels in this manner? Do they not rather let the English students deliver their words as best they can? Or do all the masters of singing in Italy know everything in connection with the right sounding of their own beautiful language? It is the custom for persons in this country to think so. If this be correct it might be inferred by analogy that all English people know how to pronounce our harder but still very fine language. The simple fact that so many elocution masters are employed and known to be necessary is proof to the contrary. And if another fact as proof is needed, the indifferent reading of the service of the Church of England will furnish it.

I conclude then it is mainly for the language they go to Italy. And that they too frequently return to England without knowing how to render the delicacies of the Italian tongue needs no proof. They might just as well have remained here. It may be asked then, are there teachers here capable of imparting, or caring to impart, the niceties of this *bella lingua?* If there are, the supposed great necessity of going to Italy no longer exists. "But," says an English student bent upon working in Italy, "I go there that I may have the language always ringing in my ear." Then he must go to Rome and not to the English quarters; he must not stay at *Milano*, for there the people converse in *Milanese*, so different from pure Italian that an Englishman speaking Italian well would find himself quite unable to take part in a conversation carried on in that *patois*.

Lastly, he may urge as an important reason for going to Italy for study, that there he may learn how best to produce and place the voice for the purpose of singing. Whether this be so or not, and this I doubt, or whether the liquid nature of the language helps to this end without a guide other than nature, I am led by this question to the last point I propose to myself in this paper, which is—how the voice of the singer should be produced and placed.

In this case we must make our appeal to nature, for the rules of art are based upon the laws of nature. Art, in this case, is the offspring of science, whether the relationship be recognized or not. When we find that a direct appeal to nature is insufficient, we do wisely to make an appeal to science and to art. The voice is a gift from heaven. There are good and bad voices, throaty and nasal voices, voices made throaty or nasal through bad instruction. Whether the voice that sounds throaty to the listener sounds so to its possessor, or whether it seems the perfection of vocal tone to him, cannot quite be ascertained. For Edison's phonograph, in its practical application, has proved, I believe, that we do not know the real tone of our own voices as they sound to others. A sufficient reason this for the aid of a good master. Now, singing is somewhat of an effort, however easily some persons may sing. It is not like simple breathing, which is an unconscious action. True and good singing needs sustained breath—here is the effort. The first thing, then, to consider is respiration. The breathing power must be cultivated if singing is to be sustained.

Before speaking of how the breath should be expelled from the lungs, I propose to consider how it should be inhaled, inspiration preceding expiration. Experience has satisfied me, observation has strengthened that satisfaction, and authoritative books I have perused, some more than a hundred years old, written by those whom in these days we should style "specialists," have confirmed the view I express, that the inhaling of breath should be as free as possible through the nose. It is the natural way, we breathe thus sleeping—usually so; and it is an Eastern custom among those who have the charge of children during sleep, to close the lips of those in their charge when seen open in order to this. But singing is not thus natural, and therefore this breathing alone is not adequate. Still the nose should be a great channel for inhaling. What are the advantages of this? They are many. This breathing helps to keep the air-passage through the nose clear, it helps to prevent a tendency to cough which rapid breathing solely through the mouth occasionally gives rise to; and, speaking generally, it is by far the most healthy way (which is the reason of the Eastern custom), it prevents many a cold from being taken.

Inhaling through the mouth only has a tendency to clog up the air-passages through the nose, to give tones a nasal quality, and to limit the power and impair the quality of the head voice—the *voce di testa*—even if it do not greatly stifle it. And not exclusively breathing through the nose when coming out of a hot concert-room on a wintry night is not free from the responsibility of having brought to the grave many a delicate person. So that the sooner this breathing

becomes habitual with singers, the better for their singing voice and their health. Some persons, I know, find a difficulty in doing this, but by adopting its practice they would soon overcome its difficulty.

Now the lungs are the great reservoir of vocal power and are capable of holding some 300 cubic inches of air. I give this on the authority of very scientific men, whose studies were concentrated on this subject, such as Sir C. Bell and Mr. J. Bishop. Now, ordinarily, only about 40 cubic inches of air are inhaled and expelled in one act of respiration, while there is an ability to expel 200. We may see from this, how needful it is for singers and actors to cultivate the *filling* of the lungs, and to acquire the power of holding in, or back, the breath, so as to be completely master of the force of the lungs. How should we proceed to get an approximation of this large quantity of air into the lungs? for the possession of lungs of such capacity and availing ourselves of the power are not identical. There are differences of opinion as to whether the lungs of a singer should be fully inflated before the execution of a long or sustained passage. Crivelli, in his work on our art, writes in the negative; but my experience, falling in with authorities I consulted in days past, justifies me in saying that a singer and an actor should habituate themselves to inflate their lungs to the utmost, especially for sustained work. Now to this end there must not be restraint anywhere, from the throat to the lowest part of the chest. The ribs must have full play; and, that they should have the sensation of widening themselves, the shoulders should be kept down. Below the chest the muscles will naturally draw themselves in for a large draught (deportment masters and dancing masters insist upon this). The sensation to the singer should be, that if a pebble were put into his mouth it would uninterruptedly find its way to the bottom of the chest, instead of going down the œsophagus. I think singers and teachers are greatly advantaged when possessed of anatomical knowledge, so far as regards the position of the organs employed in the passage of the breath. Now I find students, in cultivating this breathing power, neglect the control of the end of the expiration. They re-inflate unconsciously and unnecessarily, and, owing to this neglect, in singing a long phrase, the last note or notes come out with a quivering exhaustion. This, of course, is very bad. In order that the phrase or sustained passage should have the whole of the breath, the glottis should be kept closed till the sound is about to begin. To those not habituated to it this is somewhat difficult; but time and patience accomplish marvels. But in the expirations of breath, what is its course? It comes from the great reservoir, through the

trachea (the wind-pipe), then through the larynx to the glottis, the ligaments constituting the vocal chords; it is then guided by the epiglottis (which is in a perpendicular position) to the pharynx at the back (whence the musical tones are formed in accordance with its dimensions); it next comes to the uvula and soft palate.

The sound now proceeds either through the mouth or behind the uvula, through the passages of the head. Now it is just at this point, the division between the two, that the tone of a well-placed voice should seem to be—this is the sensation point, forward as possible—reflected, if I may so speak, by the pharynx* (which extends from the base of the skull to the little bone at the root of the tongue).

This will assure us that the head should not on any account be thrown back. Now, for the *voce di petto*, the open tone, the uvula and *velum palati* should be raised, that the voice should come freely and with resonance through the mouth—not drawn back, else a throaty tone would ensue. This open tone through the mouth is capable of great delicacy and should be so cultivated. It should not be confined to loud and robust tones. Great care, however, is needed to find out its true natural limits, beyond which it should never be forced. These limits once well assured, cultivation should be kept within them, otherwise it would be at the sacrifice of the voice. How necessary then for a master to have real practical knowledge of how to treat a voice, if he have not scientific knowledge!

But for the upper register, the *voce di testa*, or head voice —not falsetto—instead of the sound coming through the mouth it comes through the cavities of the head. When the sound leaves the back of the throat, that is, the bag of the pharynx, it passes over or behind the uvula, and thus through the passages of the head.

I need not trouble you with any scientific statements as to the power of the trachea to elongate itself, or to contract its dimensions, or to the fact that it falls considerably when the *di petto* voice ceases, and rises again for the bright tones—the *voce di testa*. I will simply observe that the seat of sensation of these two productions should be as nearly as possible the same. There should be a note equally attainable from both registers, and it should be in the power of the singer to go from one register to the other and back again while on that note. (In an ascending passage, for example, requiring a note usually taken when alone in the head register, the progression would be improved by that last note being in the same register as the preceding one. This would prevent a sort of anti-climax.) The blending of the two registers here is a point I would urge as an evidence of the right placing of

*The bag at the back.

the voice. When they do not blend the production is usually not forward enough. When it is remembered that only the lower jaw moves in opening the mouth, I am at a loss to find out how it is that some persons throw the head back in the endeavour to reach a high note, when the several organs are in front. The result of this action rather impedes the sound from proceding through the channels of the head, besides straining the muscles generally, and almost leading to the conclusion that a person so acting thought the voice passage and the food passage, the larynx and the œsophagus, were one and the same.

The blending of these two registers by some artists is so well done that it is at times difficult to say which is being used, the open or the "bright," as Braham used to call the *voce di testa.*

The fact that this upper register voice comes through the head will suggest that the head should incline rather forward than otherwise, the back part of the tongue slightly rising to direct the sound behind the uvula and soft palate and through the cavities of the head; but for the tone generally, the tongue should lie flat in the bed of the mouth, so that the sound should not be impeded.

Acting in this way with respect to the *voce di petto* and the *voce di testa*, the singer will be free from the two great defects of nasal and throaty tone, and, which is a great desideratum, free from fatigue after a good amount of singing.

If, as is the case, some of the greatest physiologists speak with becoming hesitation on this difficult subject, owing to the complexity of the structure and the many functions the several organs of the voice have to perform, your present reader, who speaks with extended experience and close observation, may content himself with giving opinion and judgment (with respect to the production and the placing of the voice) on the ground of sensation, supported by such scientific knowledge as he could master.

Permit me to repeat—that voice is best placed whose excellence is dependent upon its sensational proximity to the uvula and soft palate. Whether the sounds go through the mouth, or through the posterior nostrils by means of the *ponticello* (the little bridge), the sensation to the singer should be as nearly as possible the same.

With this I conclude. If it seem that I have unduly pressed this last point, I have done so because the question has at times been discussed with so much divergence of opinion, and because I find many unbiassed minds seem to have a difficulty in accepting any explanation offered.

I have said enough to make my views clear, which are not the formations of "yesterday," but the result of years of application, observation, and experience.

In thanking you for your attention, it remains for me but to say I should be pleased to hear any opinions that may seem to traverse mine on any of the topics discussed, in the hope that by such utterance we may get the nearer to that which all artistic natures aim for—truth.

DISCUSSION.

The Chairman.—Ladies and gentlemen, we have been listening to a very suggestive paper, and I am sure you will all join with me in according our very best thanks to Mr. Penna for reading it to us. It has been a paper marked by much common sense, the result of observation and long experience, and free, I think you will agree with me, from quackery, which is more than can often be said of papers by those who undertake instruction in singing. I will ask you, first of all, to pass by acclamation a vote of thanks to Mr. Penna for reading this paper.

[The vote was passed unanimously.]

For the rest, it would ill-become me to take up your time by any remarks of my own on this subject, inasmuch as it is, to a large extent, a specialist's subject, and there are those present who are much more capable than I am of offering observations upon the paper. There is only one thing that I can think of as an apposite remark, quoted by Thalberg in his "Art of singing, as applied to the Pianoforte"—that it has been said, I am not sure by whom, that the art of singing is the same on every instrument; that is to say, that every musical performer should direct his attention to the production of a really solid, travelling and pure tone. That is what we, who are pianists, have to direct our attention to. It is an art that is very much falling into disuse now, because, as I think, the principles of touch are very much overlooked, and a very different school of teaching, and therefore a very different kind of tone, is now produced by pianists from that which prevailed in my student days.

Some of the observations that Mr. Penna has made in the early part of his paper seem really addressed rather to composers than to singers, and if there are those present who are engaged in the writing of vocal music, it would be well for them to give heed to all that Mr. Penna has said with regard to accent, and so forth. I will not detain you longer, but ask any of those ladies or gentlemen present, who understand more than I do technically about the art of singing, to discuss the points which Mr. Penna has so ably and suggestively raised.

The Rev. C. R. Taylor.—This is a subject to which I have

devoted much attention, and I have listened with considerable interest to all Mr. Penna has said. Perhaps I might be allowed to enforce his remarks about accent. The indifference of composers to this point is a matter which has often troubled me, especially in the services of the Church. The accent or emphasis is frequently given to syllables which would receive no stress from a good reader, while sometimes the converse of this is the case. Most conspicuously is it misplaced in the "Gloria," when we are made to say "Glory be *to* the Father, and *to* the Son, and *to* the Holy Ghost," with false emphasis on the preposition. If choirs were taught to lay stress upon the conjunction "and" it would be in accordance with the best reading, and would bring out more clearly the important truth which the Arian heresy tried to controvert by altering the original words. I am glad, therefore, to have this opportunity of stating how thoroughly I agree in the wish that our composers would be more careful in marking the proper emphasis and accent of their words, especially in the setting of the Church canticles.

Mr. Penna put before us some of the more important points in regard to breathing, but I did not quite understand whether he intended to speak in favour of or against what is called "abdominal breathing"; but, at any rate, he spoke very decidedly against having any restraint of tight clothing, and that is important. If persons, whether intending to sing, or to read, or to speak in public, would but get their voices wisely cultivated before appearing, it would be not only a great blessing to themselves, but also to all who attend concerts and lectures, and to thousands of church-goers who are pained beyond measure at the horrible way in which voices are abused and syllables mis-accentuated in churches throughout the land.

Mr. A. D. Coleridge.—Though I have but little to say, I should like to express my gratitude to Mr. Penna for his interesting address. I was glad to hear honourable mention of a musician too soon forgotten, Sir George Smart. The false accents to be found in the music of even such men as Handel and Purcell used to be subjects of irreverent jests to myself and many of us in school-days. One instance occurs to my mind in "The Messiah," "I know that my Redeemer liveth," where the stress invariably laid on the word "my" would seem to indicate a monopoly of salvation. In connection with Sir George Smart another name occurs to me, that of Joah Bates. I took some pains a few years since (Bates was a Fellow of my old college, King's College, Cambridge) to find out from Sir George Smart how it came about that a young B.A., though a good scholar and a distinguished man, should have been specially selected to conduct the first Handel Festival in Westminster Abbey. I

waited on Sir George Smart, hoping to get the information from that gentleman. I remember his saying—"I am not going to humbug you; Joah Bates was a grandee, and I, a young chorister boy aged ten years, never dared to speak to him; I merely stood by his side and turned over the leaves at the organ; I never questioned him as to his recollections of Handel, I was too young for that." I fancy that Handel was a better Italian scholar than English; some of his Italian letters are far better expressed than what I have seen in the English collection. Some three months ago I called at Hastings on Mr. Charles Lockey, a favourite singer of mine in boyhood, and he told me that Sir George Smart was the best authority for Handelian traditions. Lockey studied under Sir George for seven years, and owed to him much of his success as an interpreter of sacred music. After some experience of Italian masters in Milan, Florence, Rome, and elsewhere, I must endorse some of Mr. Penna's observations respecting them. With some exceptions, I think their merits, as a class, are exaggerated. They are too often very inferior musicians. The difficulties with English vocalists are in the management of the vowels, and notably with "e" and "u." Here the Italian has naturally the advantage of us, and can teach us a good deal. I heard at the Birmingham Festival a certain famous soprano shirk the word "beak," and substitute for it the exclamation "Ah!" Vowels are a great difficulty, but I have known English masters as competent to deal with such vocal difficulties as the Italians.

Mr. Herbert.—I imagine few have suffered more than I have from the bad marriage of music to words. I have had a good deal to do with congregational singing, English hymns, and so on, and the tunes that have been put to some Catholic hymns have been something so dreadful that I scarcely have words to express it. As to what Mr. Penna said about accent on discords, I also have felt that constantly in plain chant, always taking care that an accented note should be on a discord. I remember Braham very well, and can confirm everything Mr. Penna said about his wonderful singing in every respect. There is another thing about accent I should like to mention, and that is the definition of musical accent. I have often been asked to define it, and I did once try to do so. It occurred in this way. There was an organ recital at Bonn in Germany, where I was living, by one of the first organists on the Rhine, and the organ builder, in whose shop the performance took place, asked me afterwards what I thought of it. I said I did not think very much of it; it was correct, but there was no accent. Well, the organ builder said, it is not possible to play with accent on the organ. I said "indeed?" He said he did not think it was, and he turned to two professional men, a pianist and a violoncello

player, and he said, "Nicht wahr, meine Herren?" The cello player held his tongue like a wise man, but the pianist also thought it was not possible. So I said, "Well, supposing our definitions of accent differ, I should like to hear you define it." He hesitated a little, and he said: "I suppose I should define accent in a phrase or series of notes as playing one note stronger than the others." "Oh," I said, "that is quite enough; if that is your definition of accent I quite understand." Of course on the organ you cannot make one note stronger than another. There were no swells in Germany then. That led me to consider whether one could play with accent on the organ. I should say that I fulfilled the duties of organist at that time for seven or eight years, and at last I came to the conclusion that musical accent consisted in *taking a very small quantity from one note and giving it to another*. That definition has been given to several professional organ players here in London, and has met with very great approbation, and they said it never occurred to them, but they felt sure that was the right way of putting it. I do not know whether you will approve of this, but I give it to you for what it is worth. Then with regard to the projection of the voice. I was taught by a man whom some of you may remember, whose name was Herr Kroff. He was a Bohemian by birth, and he came over here and was the first who sang Schubert. On all the first edition of Schubert's songs—Wessel's edition—you will see "Sung by Herr Kroff." He had a certain theory which, I believe, died with him. I do not know how it is now-a-days, but I asked Mr. Thorndike, and he agreed with it to a certain extent. The theory was this, that as the voice rises in pitch the larynx descends. There was apparently something in it, but whether it was really founded on absolute truth I have no means of ascertaining. He had no professional pupils, but his own singing was something superb. I have heard him sing "Adelaida" as I have heard no one else ever sing it; and Handel he also sang very well. He agreed most certainly with Mr. Penna as to the pressure in the lungs preceding the emission of the voice, and since that time I have thought a great deal about it. It is the same as in the bow of the violin; the pressure of the bow must be on the string before the bow is started. The same thing with the organ, the wind must be in the bellows before the key is touched. If it is not, you will have a certain sound which we all know perfectly well. I think I might supplement Mr. Penna's admirable paper with a few remarks on speaking in public. We all know how few amongst us Englishmen know how to speak. First of all we do not know how to use our voice, and next, we never know exactly what we are going to say, and we hum and haw, and put in that extraordinary

"er," which every one is so fond of. Then, every one speaks on too high a note. Latrobe, who wrote on Cathedral Music, tells those who intone the prayers to do it as low as they can, "to the end that the people may the better hear," and I believe that in every case if speakers were to pitch their voices lower they would do well. I once heard the best preacher in the town where I lived, Bonn, preach a sermon, the first words of which were (in German, of course), "We want men." Those words he uttered at a shout—an absolute shout—as loud as he could and as high as he could. If, instead of that, he had begun quietly and then gradually raised his voice as the occasion required, a much better effect would have been produced. Another point is, that none of us, or very few of us, know how much of our voice is available for speaking. Of course you all know that everyone has, more or less, an octave and a half in his voice, and I maintain that the whole of that is to be used, and can be used, in speaking, if you know how. If any one would take the trouble to take a single speech, either the soliloquy in "Hamlet," or the soliloquy in "Cato," in Addison's play of that name, and begin on the lowest note on which he can speak distinctly, and then gradually raise the voice until he came to the highest note (of course that will not be what is right, that is scarcely credible), it would show how much of the human voice can be used in speaking. I believe the great majority of speakers confine themselves to three or four notes, and I certainly believe that they can use, and ought to use, a good many more.

Mr. Southgate.—I should like to join in the tribute of satisfaction that has been paid to Mr. Penna for his paper; but there is just one part of the first portion which calls for a word of warning. It is what I may almost venture to term his denunciation of accent, not right accent, but accent in an unusual place. It must be remembered that (independently of the words) music itself has its accents—its rhythmic accents. It is not always possible that the musical accents and the accents of the words should coincide. No doubt it would be a very happy thing if they did. We know that in the early times this was a matter on which there was complete indifference; if I remember rightly, it is recorded that Lawes, in the reign of Charles I., first taught us how to place the accents of words and poetry together to produce a good musical effect. Of course, Mr. Penna's remarks would apply specially to what we may call solo singing; he would not so argue with regard to quartet singing or part-writing; in the case of fugues, &c., we have really no words, or words of very little signification. Fugues and canons are principally a set of exercises, if I may say so, on musical notes; therefore, I pass over that; it is just a question of the words of a song. Now in setting a poem,

a composer may have to adapt it to a certain time; he feels that to get it into a rhythmical period, the time accents will not always coincide with the words; he is therefore driven occasionally to put very important words, not at the primary, or first accent of the bar, but in some other place. The words must be there, and the music must fit them as well as it can. I quite agree with what has been said by Mr. Penna and others, that composers very often show a very large amount of indifference as to where they do place those words, and they might well place them better. In the case of Handel, it should be recollected that he was a foreigner, that he never thoroughly mastered our language, although he was here very many years, and there are in his oratorios many grotesque examples of his having misplaced words. One might cite a dozen, but there is one example in that chorus in Solomon, "May no rash intruder." It always struck me on hearing that, how false is the accent. It is a beautiful chorus, the harmony on a pedal point at the end of it is one of the most delightful things Handel has written; but that "May no rash intru*der*," with a strong accent on the last syllable, jars on the ears very much indeed. Mr. Coleridge mentioned a good specimen from "The Messiah," and there is an example of the same character in "Israel in Egypt," "Thou shalt lead them forth." It is impossible for the singer to sing the music with the words Handel has attached to it. Neither can the breath be taken nor can the phrase be properly finished, and so it has to be altered. Of course, Handel was a foreigner, and did not know better; but we have amongst us many composers who ought to know better, and fail to make the accents coincide. There is another view of the subject which I venture to think presents much greater difficulty in making the accents go right. What are you going to do in the case of the large collections of songs translated from foreign languages? Beethoven, Schubert, Mendelssohn, and others have written songs in German, and in other languages which people will have sung in English, and they must be put to the best English words you can get. What a terrible difficulty the unfortunate translator and adaptor has to cope with. There are accents which may fit the words to which the song was originally written very well, but they can no longer fit them in the adapted version, and therefore they cannot coincide. Though we may agree with Mr. Penna, we must exercise a little caution in condemning misplaced accents. If you place rhythmic restrictions on translators and adaptors you may fail in obtaining an exact rendering of the music, which foreign composers have set to other than English words. With regard to going to Italy to study and hear music, I can endorse all that has been said. I have been to Italy and, I

must say, more dreadful music I have never heard, either in churches, theatres, concert-rooms, or streets. The charming Italian music is all a myth, according to my experience. But is there not one reason for professional singers going to Italy which seems a more likely explanation—the fame of the great Italian schools of singing? I think there is a sort of feeling existing among our thoughtful students that if we go to a singing-master in London we shall first run through our exercises, and then we shall get on quickly to songs. If you go to Italy, it is for a long course of grinding at the scales and solfeggios, and for very few songs—so I am informed. That affords something like an explanation why people go there. The most important part of Mr. Penna's paper, I think, was that in which he rightly and properly complained of the mispronunciation of the English language. I am afraid that does not apply to singers only, as Mr. Taylor told us, it is also applicable to speakers, and we all recognise that. Most people are not taught to speak properly; possibly the fault is not quite their own; one consequence is that when people begin to sing, instead of taking special pains to master the words of their songs, they treat them just as if they were words they were going to speak, and get through the song in the best way they can. That is one common fault we are all painfully aware of. In a song of Mr. Gerard Cobb's, I recently opened, I saw a good little note he had put at the commencement, which struck me as being quite advisable for singers to turn their attention to. He says it is necessary, in order to sing a song properly, and to get the proper amount of expression from it, to master the words first. He prints the words at the beginning of the song, and begs singers to sing them through and appreciate their significance before attempting to render them. I think that is a very good idea. There is one special singer before the public now who is a great favourite; it would not be right to mention the name, but so badly does she pronounce the words that I have frequently heard her sing, and for a long while have not been able to determine the language she was singing in. I say that, having some little knowledge of foreign languages myself; but it was impossible to tell what language was attempted. That is a very great blot, and one we ought all to set ourselves to remove; because, if music is to heighten the effect of words, and to give forth emotions beyond the mere utterance of words, then pray let us get the words clearly so as to obtain the dual effect of the music and the words together. As to the latter part of Mr. Penna's paper, I think possibly only experts should speak; but I must say, from my limited knowledge of what was stated, I should quite agree with him; and in the statement he made about the tongue lying flat in the mouth, it is very necessary to

allow the breath a free passage of sound over it; but there are sounds in the English language which require the tongue to be brought forward. In almost all cases where the letter "t" occurs it is absolutely necessary for the end of the tongue to touch the teeth, and there at once you get a restriction of the sound. Possibly, in reply, he may say a word on that point.

Mr. Penna.—Generally speaking, I am happy to find that my views have been confirmed by all who have done me the honour to make remarks on the various points referred to in my paper. I am much obliged to Mr. Taylor for assenting to everything I said, and I beg to confirm what he said with respect to improper accents in church music. When I was bass singer at St. Andrew's, Wells Street, I used to be very much concerned at times with the bad accents on words, because, prior to that time, I had been a student of elocution, and knew quite well where the accents should be in speaking, and therefore I was very much irritated in finding so many accents which jarred against my sense of what was right. With respect to the diaphragm breathing, I do not know whether I ought to say that I quite coincide with that; I do not wish to say that it is wrong, but, at the same time, my idea is that you should get as much breath in the lungs as you possibly can to the very lowest part, and I have always thought, and found it to be true, that the abdominal muscles drew themselves in when you inflate the lungs. You should have the sensation of widening your chest; I do not mean to protrude it at all, but just to widen it to get it inflated. I do not quite understand diaphragm breathing; if it is meant that there should be a depression of the muscles here, I do not think it gets a larger amount of breath into the lungs. But I think if you take breath in without thinking that you are doing it, the lower muscles are drawn in, and the more you inflate with that view I think the more successful you will find you are. I am pleased also to find so much assent to what I have said by Mr. Coleridge and others. With respect to Sir George Smart, he had the tradition of the Handelian songs to a remarkable degree. I was not so long under Sir George as Mr. Lockey was, but I received a great deal of instruction from him when I was in a position to appreciate it to its full. I need not say anything of what he said to me any more than that he expressed gratification with the attention which I assuredly paid to what he said. He gave me reason to believe that many of the alterations he had made in Handel's songs were traditions handed down by the great master or accepted by him. There are ample reasons for thinking that Handel himself allowed Mr. Beard, who was his great tenor, and other singers whom he confided in, to make just what alterations they pleased, not only with respect to accent, but with

respect to ornamentation; but, as I said in my paper, nobody in the present day seems to have courage to do such a thing. Whether the mind or intellect is wanting I do not know, but I do not see why there should not be made graceful notes. Crivelli has some very valuable arguments in its favour in his work on singing, and introduces an example from Gluck, and those who read his book will be quite of opinion, I think, that the change of notes for accent's sake in the Italian makes an improvement. This remark I ought to make, too, in connection with what has been said with respect to translations. Mozart's "Clemenza di Tito" was, I think, composed in German,* and when it is in Italian some of the notes are altered, and in one case, I think, a minim is changed into four quavers, or something like that, in order to get the best sense of the words out. The remarks which Mr. Herbert has made I coincide in, and I think his definition of accent is something quite unique and worth consideration. It is rather like what is called *tempo rubato*, is it not, taking from one note and adding to another a minimum of it? [At this Mr. Herbert shook his head.] But a good effect is produced at times by *tempo rubato*, and one can understand perfectly well that accent may be estimated according to that definition. My remarks certainly appertained to solo singing. Of course, Mr. Southgate is perfectly right that in quartets it would be impossible that every word and note should have the right accent, otherwise the quartet would be all up and down, anyhow; you must recognise *musical* accent entirely in concerted pieces. Translation is a great stumbling-block. I have said for years that if an Englishman is to sing Schubert's songs, or any of the German *lieder*, he must sing them in the original language. It is very difficult to give the full sense of the phrases in the new tongue. I do not know that anyone is perfectly justified in making the necessary alterations in a German composition while the writer is living, in case he might find fault with it; but it has often been a stumbling-block to thoughtful singers to render translations of songs, and it is very rarely that any good comes of it. About the words in speaking, elocutionists are needed in this country, not only as regards vowels, but also as regards consonants; and I thoroughly confirm what has been said as to keeping the voice down; if you speak in a high key the voice vibrates too much, and you never quite hear what the word is. If people will speak deliberately, sound the vowels and consonants rightly in a low key, the voice will travel. With respect to the tongue, for the voice to come well out of the mouth in the open tone you must keep the tongue down and the tip of it should be against the lower teeth. I quite agree

* I have been informed that though the opera was first produced at Prague it was rendered in *Italian*.

in that, but, of course, for certain words you must raise it; but I was speaking in a general way with respect to tone. To get a volume of tone out of the mouth you must have the tongue in the bed of the mouth and its tip against the lower teeth. When you elevate the uvula and soft palate at the same time you have a fine opening for the sound. I do not think there is anything else I need say. I rather thought there would be more divergence of opinion, and it is a source of happiness to me to find that the labour of all these years has not been in vain, but that it is confirmed by gentlemen with very large experience, whose remarks have afforded me exceeding pleasure to listen to. I am much obliged to you, sir, for presiding on this occasion, and I thank you all for the kind attention you have given to the paper.

Mr. Southgate.—I might be allowed to add that some foreign composers have been very particular with regard to the words. It was lately my duty to examine the original score of the "Elijah" of Mendelssohn, and Mrs. Bartholomew kindly placed it at my disposal. It was Mendelssohn's habit to send the score in pieces to Mr. Bartholomew to put the English words to it; so exact a man was he that frequently he was not satisfied with the words Mr. Bartholomew had written, and, knowing our tongue very well indeed, understanding and appreciating our accents, he frequently altered and selected much better words than Mr. Bartholomew had adopted. It is easy in the original score to see this, because Mendelssohn has written his words in lead pencil, whereas those of Bartholomew are all in red ink, and I must say in many cases Mendelssohn's English was the better of the two.

A vote of thanks to the chairman concluded the proceedings.

February 3, 1890.

Professor W. GRYLLS ADAMS, Vice-President,

In the Chair.

RICHARD WAGNER.

By the Rev. Henry Cart.

Ladies and Gentlemen,—I feel that by way of preface I must ask your pardon for venturing to intrude upon your notice a paper very hastily composed, scrappily written, and to a great extent carelessly put together. I must tell you that when the idea of this paper first suggested itself to me I hoped that I should be able to devote much time and study to the consideration of so vast and absorbing a subject, but since then circumstances have materially altered, and I have been obliged to give my whole time to other matters more especially connected with my work as a clergyman which previously had not been thrown in my way. But is not this the way with so many matters in this hurrying, driving, bustling, brain-wearing age in which we live; we propose to ourselves great things, but how many attain to them? I at least so far as this paper is concerned must in dust and ashes sit with covered head and say "Peccavi, I have sinned." And then again, why should I speak to you about Richard Wagner? I never knew the man, I only saw him once; I have never been to that musical Mecca, Bayreuth; I have never seen any of his operas performed in his native land; and I have not exhaustively studied his life, works, or character. Well, I suppose there are two reasons to account for this whimsical caprice in my selection of a subject: first, a blind following of the spirit of the age, a spirit which prompts people to talk a great deal about what they know very little of; and secondly, an earnest desire on my part to ascertain the attitude of members of this Association towards so great a genius as Wagner, and to elicit a genuine expression of opinion as to the future prospects of what has been not inaptly, though I will not say prophetically termed "The music of the future." If this paper only arouses and awakens an interesting discussion amongst the members here present, my object will have been more than fulfilled, and we

shall all leave this room with the very candid opinion that the second half-hour has been far more entertaining and useful than the first one. Such sentences may suggest to wily-minded individuals that I am what is called "fishing for compliments," but I assure you I am not; I am convinced within myself that I am speaking solid and indisputable truth.

But enough, or rather too much, of preface; if I run myself down any more I shall have you all leaving before I have begun, and therefore let us to work. Richard Wagner was born in "La Maison du Lion Rouge et Blanc," at Leipsic, on May 22nd, 1813. He was the ninth and last child, and soon after his birth, his father, who held a small appointment as "greffier de police," died. It is noteworthy that Wagner's father had a great taste for things dramatic, and was also fond of poetry; on one occasion this worthy acted in a somewhat rough and ready representation of one of Goethe's plays. We must also bear in mind that Rosalie Wagner, a member of the three triads which formed the family, was accounted a good tragedian. Dramatic instinct and appreciation were therefore existing elements in the family from the outset. These elements were further accentuated in the fact of Albert, the eldest brother, becoming an actor and singer at Würzburg and Dresden, and afterwards "regisseur" at Berlin. This brother had two daughters who were singers, and and one of them was compared to no less a person than the famous actress—Wagner's star and ideal divinity—Madame Schrœder-Devrient.

Wagner seems to have had a most inspired birth, for, according to his own account, the Norn—*i.e.*, one of the Fates in the Scandinavian mythology—deposited on his cradle "the never-contented spirit that ever seeks the new," a gift which seems to me of somewhat more than doubtful value. But as yet the apostle of Bayreuth lay in his cradle and peacefully slumbered.

The mother did not long endure the estate of widowhood, but in hot haste married one Geyer, now a painter, but formerly an actor. This imported into the family a fresh amount of enthusiasm for the drama and everything relative to it, and had an immense influence on the very impressionable mind of the young Richard. It seemed the decree of the nursery-cradle Norn that Wagner from the first should be bereft of paternal guidance, for Herr Geyer died just before the boy had completed his seventh year. At the age of nine Wagner was very fond of playing to his friends his small *répertoire*, consisting of the Overtures to "La Flute Enchantée" and "Der Freischütz." These were from necessity performed on the pianoforte, an instrument with which Richard in after years was never in love. The young enthusiast had a wondrous admiration for Weber and for his works, and you

see in this that Wagner was unconsciously selecting a model for his own school of music, though little but blind devotion to a great master was evident at this early age. Writing in 1860 Wagner frankly says, "I received from this master my first musical impressions; his melodies filled me with enthusiasm, his character and his nature exercised on me a real fascination, his death in a far-off country filled my childish heart with desolation."

Wagner's first school was the Kreuz-Schule at Dresden, and whilst here he developed a great passion for the study of Greek, as also of poetry and mythology, and a great predilection for the works of our immortal Shakespeare, or Lord Bacon, or whoever else we may have to thank for our marvellous dramatic inheritance. As instances of his application to these subjects it may be mentioned that in his leisure time he translated, merely for amusement, some part of Homer's "Odyssey"; also that he took the prize at a "concours poetique," and undertook by himself a metrical translation of one of Romeo's monologues. (A remark *en passant:* does not all this remind you very much of certain similar characteristics in the early stage of the career of that illustrious musician, Hector Berlioz?)

It was at this time that the boy took in hand the stupendous and immense task of writing a tragedy, which was conceived on such liberal lines that no less than forty-two persons died in the course of the piece, and most of them were obliged to be resuscitated and to appear as ghosts in order to supplya *dramatis personæ* for the last act.

In 1827 Madame Wagner returned to Leipsic, her daughter, Rosalie, having secured an engagement at the Stadt-Theater in that city. This necessitated the placing of young Wagner at another school, and it was now the College Nicolaï that claimed him as a pupil. Wagner's natural pride at this juncture suffered a great rebuff, for, as regards his studies, he was now placed in a lower grade than that which he had occupied in the classes at the Dresden school, and so the young gentleman sulked a little, and thought a great deal more of and about music than he had hitherto done; in fact, lessons were soon neglected for the study of what was to become one of the absorbing passions of his life. This musical longing received a great impetus from the hearing of some excellent performances of Beethoven's Symphonies at the far-famed Gewandhaus concerts. The death of Beethoven which occurred at this time served much in intensifying the impression produced on the child by these mighty works of musical genius.

After hearing Beethoven's "Egmont" Wagner thought he would study harmony, and having purchased Logier's "Traité d'Harmonie" at a secondhand bookstall, and pored

over it for eight days, he set to work to compose music for the grand tragedy of which I have already spoken. The music of the young Wagner was to be, in his own idea, somewhat similar to that written by Beethoven, for were they not, even though the hand of death had removed one of them, illustrious composers!

Wagner's next work was the composition of an overture, and this was taken with wondrous assurance to Dorn, the *chef d'orchestre* of the royal theatre, Wagner having obtained an introduction through his sister, Rosalie. Dorn accepted it, put it in rehearsal, and had it performed between the two acts of a piece then being played at the theatre. In the scoring of this composition the drum was very prominent, and indeed so preponderated that the overture was at once nick-named "Ouverture aux timbales." Wagner thus remarks on this early effort: "This overture was indeed the culminating point of my folly. To facilitate the proper interpretation of the piece I had had the notion to write it in ink of three different colours: the music for the strings was written in red ink, that for the brass in green, and that for the wood-wind in black. The general treatment of the work was so elaborate that Beethoven's Ninth Symphony would have seemed, in comparison with it, as nothing more than a Sonata by Pleyel."

In 1830 Wagner entered the University of Leipsic as a student in philosophy and æsthetics. It was here that he met Theodore Weinlig, cantor of the Church of St. Thomas, and this good man made it his task to lay a thoroughly excellent foundation for any subsequent musical studies which his pupil, Richard, might engage in, and thereby did more real good for the youth than can at first sight be appreciated.

Wagner was soon at composition again, and now produced a polonaise, a sonata for the pianoforte, an overture with fugue, another overture, and a symphony in four parts or divisions.

In the summer of 1832 Wagner visited Vienna and Prague, and it was at this latter city that his symphony was first performed. Whilst at Prague he composed a dramatic poem entitled "La Noce," and on his return to Leipsic began to set it to music; but on his sister Rosalie objecting to the poem, he tore it up, and thus brought his work to a hasty conclusion. (Another passing question now suggests itself: Why is it that all musicians, especially those whom we call *great* musicians, are so uncontrollably violent as regards their temper? Are they out of tune with the universe, or only jarred by discordant humanity?)

Heinrich Dorn, writing in 1832 about Wagner's extraordinary devotion to and admiration for all that concerned Beethoven and his works, says: "I am doubtful whether there ever was a young musician more familiar with the

works of Beethoven than Wagner at eighteen. He possessed most of the master's overtures and large instrumental pieces in copies made by himself. He went to bed with the sonatas, and rose again with the quartets. He sang the songs and whistled the concerti, for with pianoforte playing he did not get on very well; in brief, there was in him a regular *furor Teutonicus*, which, combined with considerable scientific culture and an extraordinary activity of mind, promised powerful shoots."

During the course of the year 1833 Wagner's symphony and one of his overtures found a hearing at the Gewandhaus concerts in Leipsic.

The young composer was at this time much written up and belauded by his friend Henri Laube, who in the *Journal du Monde Elegant* gave him the most flattering criticisms.

Wagner now spent a year with his brother Albert at Würzburg, he having the post of *chef des chœurs* at a salary of ten florins per month. During this time he was engaged on the composition of his first grand opera, "Die Feen," the subject being taken from a fable by Gozzi entitled "la Femme Serpent." The music of this work reflects in great measure the triple influence of Beethoven, Weber, Marschner. It may seem strange to include the name of Marschner, but Wagner was at this time much impressed by a study of this composer's opera of "Hans Heiling," and it was during his stay at Würzburg that Wagner composed a finale to an aria in Marschner's "Vampire," writing both verses and music, of which latter there were 142 bars.

In the spring of 1834 Madame Schrœder-Devrient sang in opera at Dresden, and much was Wagner charmed and delighted with her singing and acting. From that time she became his ideal in so far as she represented to his mind a most perfect combination of the musical and dramatic arts.

It was about this time that Wagner, deserting the true principles of his art, began to think of what would please the masses and therefore result in pecuniary gain to his own pocket, and he noticed that applause was most frequently given to the music of Bellini and to the dramatic action contained in such operas as Auber's "Masaniello." What a happy thought, what a blest result, could he only in some way combine the two! The attempt was made in Wagner's second opera, written during a vacation at Toeplitz in Bohemia. The subject was taken from Shakespeare's "Measure for Measure," and the work was known in the French as "Defense d'aimer." If one pauses here for a moment to contrast these two early operas from Wagner's pen, "Die Feen" and "Defense d'aimer," you will see that they present in miniature the two opposite extremes of thought which may be discovered as running throughout

Wagner's subsequent and later works; two streams of thought, sometimes associated, but most often disassociated, the one tending towards all that is good, noble, pure, self-sacrificing, and heroic; the other boiling, bubbling up, and surging over with all that is fierce, passionate, hateful, sensuous, carnal, and immoral. You may see these characteristics, combined with a rare genius and extraordinary amount of inventive skill, in Wagner's "Tannhäuser," where *Venus* and *St. Elizabeth* strive alternately for the victory.

In 1834 Wagner accepted the position of musical director at the theatre of Magdeburg. During the first year he was in office there the overture to "Die Feen" was performed, as also another overture he had written for a drama called "Christopher Columbus," a composition for New Year's Day, the theme of which was based on the *Andante* of his symphony, and some songs he had written for a whimsical farce called "The Spirit of the Mountain."

Wagner's second opera was performed at Magdeburg in the spring of 1836. There were two representations, the first one being for the benefit of the director of the theatre, whose affairs were in a state verging on bankruptcy, while the second was for the benefit of the luckless composer. A fairly good audience assembled for the first performance, but as the singers were in a state of thorough disorganisation, a hopeless state of confusion prevailed throughout the evening. At the second performance matters came to a crisis. The audience consisted of the director and his wife, and a Polish Jew arrayed in holiday costume. Before the rising of the curtain a free fight was engaged in by all the artists, so that the "regisseur" was obliged to come forward and announce to the overflowing (?) audience that the performance could not take place at all. The music of the opera was much praised in a Magdeburg newspaper. It should be mentioned that, before the first performance took place, the dramatic censor, who had not seen the body of the work, yet objected to the title, and insisted on its alteration, though, as regards the work itself, he solemnly accepted Wagner's artfully-conveyed assurance that it was founded on a *very serious* play by William Shakespeare. The new title given to the opera was "La Novice de Palerme."

Wagner now tried to get the opera produced at Leipsic, but the very free tone of the libretto was objected to; he therefore took it to the manager of the Residenz Theatre of Berlin, and it was here that he saw Spontini conducting his opera of "Fernando Cortez," a sight which much impressed him, he being especially filled with admiration at the rhythm and precision of the whole, and the intimate connection between the music and the action.

It may be interesting here to note that Wagner uses an air from "La Novice de Palerme" in "Tannhäuser," in the introduction to the third act.

Wagner, after a short stay with Dorn at Riga, rushed off to Königsberg, whither he was attracted by the presence of Wilhelmina Planer, his *fiancée*, she having secured a part as *première amoureuse* at one of the theatres there, and, having gained the post of leader of the orchestra at the same house, he forthwith entered into the holy estate of matrimony. His marriage day was November 24th, 1836. Wagner stayed for a year at Königsberg, during which time he composed two overtures, one on "Rule, Britannia," the other entitled "Polonia."

He then returned to Riga, his friend Dorn having obtained engagements at the theatre there both for his wife and his sister-in-law, and having offered him the post of *premier directeur de la musique.*

On December 11th, 1837, a benefit performance was given for Wagner at the theatre at Riga, and at his own request the opera then performed was Bellini's "Norma."

But Wagner was by this time tired of the barrenness of life at Riga, and longed to try his chance in seeking fame and reputation in the great Parisian capital, which seemed to him then the veritable abode of all true art. The spell was on him, and whilst writing the music for an opera comique in two acts, "l'Heureuse Famille d'Ours," he made the discovery that he was really doing nothing more than composing music "à l'Adam," and his disgust reached its height.

As a sort of preface to his intended journey to Paris he made a sketch-plan of "La Grande Fiancée," a novel by Henri Koenig, and sent it to Scribe, asking him to use this as material for a poem, and to be good enough to get the work accepted at the French Opera House.

With this consummate piece of impudence we will, I think, take leave of the young man, Richard Wagner.

On January 25th, 1866, Wagner, who was at the time at Marseilles, received the news of his wife's death, and on August 25th, 1870, two months after the performance of the "Valkyrie" at Munich, he was united at Lucerne to Madame von Bulow, *née* Cosima Liszt, the daughter of Franz Liszt and Madame la Comtesse d'Agoult. Madame Bulow was at this time twenty-nine years of age, and she had a family of four daughters; the eldest of the number afterwards married the Italian Count Gravina, and another was united to M. de Thode, of the University of Bonn.

Von Bulow, who up to this date had been Wagner's bosom friend and staunch supporter, on discovering his wife's desertion of him, exclaimed: "If it had been some one

that I could have killed, I should already have done the deed." But to him Wagner, though his betrayer, was sacred as the Genius of Music.

It is often said that genius is not judged by any conventional standard of morality, and this maxim seems to have been appreciated in all its fulness by the immortal Richard; looked at with ordinary eyes his second marriage was certainly more of the Mona-Caird type than is generally considered desirable.

The fundamental principles which Schopenhauer has laid down, so far as music is concerned, for the metaphysical essence of the art, Wagner, without any modifications, has adopted as a basis on which to erect his own theories respecting the same. There are two sides to Wagner's artistic movement; one negative, the other positive. In the first instance, he has abolished the petrified formalities which, in the course of centuries, had gathered round the dramatic poem. His last and supreme purpose is the attainment of dramatic truth. The first excrescence of the opera which he attacked was the aria, which had, in the course of time, obtained undue importance. It need not be added that other forms of absolute music were also swept away by this modern reformer, but Wagner (and in this we have to recognize the positive side of his work) has at the same time erected a new form of musical expression, which originates from, and varies with, the impulse of dramatic passion. In one of his most important literary works, "Opera and Drama," Wagner urges the demand of a co-operation of all the arts, that is, of painting and sculpture as well as of poetry and music, in the drama of the future. When we look on Wagner we must remember that he was a dramatist as well as a musician, his stage directions being always of the minutest kind, and showing all that skill and knowledge of scenic effects which so favourably distinguish him from most other German dramatists.

Weber was the first of the so-called romantic school to engage in critical and æsthetical literature, but Wagner's fertility in this department exceeds anything ever before attempted. The results of his literary labours occupy no less than nine volumes, and besides these one may include such "miscellanea" as a collection of letters to the Mayor of Bologna on the stage; correspondence with Berlioz, Liszt, and others; and an autobiographical sketch extending to the year 1842. Consider also the enormous amount of painstaking labour expended upon the libretti for his operas, all of them the work of his own hand, and add to this the circumstance that a most intimate acquaintance with mediæval folk-lore and Scandinavian mythology was a primary necessity in their

composition, and you will gain a faint idea of this man's literary activity!

Wagner was also distinctly a poet—his whole nature and temperament were imbued with the poetic instinct—and though the form in which he has cast the dialogue of his great music-dramas may not accord with our preconceived notions of beauty, yet it was the most suitable to illustrate the impressions which were intended to be conveyed to the mind of the hearer. The alliterative principle which Wagner so largely employed is the metrical basis of all Teutonic poetry, and represents most nearly the "staff rhyme," as found in the Eddas and Sagas of the Northern mythology.

Wagner's position in musical history seems to me a somewhat unique one. He stands, as it were, in a niche of his own making. His peculiar tendencies may be said to have called forth a new class of singers, musicians, and *litterateurs.*

There is no doubt, as regards his relation to the new romantic school, that though Berlioz was the founder of the same, Wagner must ever be regarded as its first and foremost disciple, supporter, and adherent. Berlioz started the school, Wagner made it, threw into it all his life-work and full tide of rushing and tempestuous enthusiasm, and scored a brilliant second to Berlioz's somewhat uncertain first.

Wagner must ever be a remarkable figure in the history of the growth and development of music, for he marks a new era. He presents himself in so many and varied aspects—at one time we see him as a fierce controversialist and pamphleteer, at another as a poet, at another as a musician of extraordinary if mistaken powers, impatient of conventionality, and heedless of the prim-set confines and iron boundaries of musical form and expression; at one time as favouring the Italian school of melody, at another as scouting all connection with so degraded a form of art; at one time the companion of kings, at another correcting proof-sheets to earn his daily bread. The man is complex, intricate, many-sided, original; the artist is there though under various guises; the genius is unmistakable.

Wagner died on February 13, 1883, at the Palazzo Vendramini, at Venice, a house which was at that time the property of the Comte de Chambord. The composer had for nearly a year before this date been warned by many unmistakable symptoms of his rapidly failing health. On the day in question, Wagner was preparing to go out on his usual daily round in the gondola; but just before leaving the house he became engaged in some dispute which provoked him to one of those violent fits of temper which were an unfortunate attribute of his nature, and in the midst of his rage he suddenly jumped up, saying, "I feel very ill," and fell fainting

on the floor. He was at once carried to his bed, and his doctor, Doctor Keppler, was summoned on the instant; but all was over, and Keppler only arrived to find him a corpse within the arms of his wife, who thought him asleep.

Madame Wagner was only removed from the body after twenty-two hours had elapsed, and then gentle force had to be employed, so terrible was the prostration and anguish of her afflicted soul, and it is said that for nearly four days she would partake of no nourishment.

The real cause of Wagner's death was a rupture of the right ventricle of the heart, though many internal complications naturally hastened such a catastrophe.

The body was embalmed by Professor Hoffmann of Berlin. The funeral was at Bayreuth, at four o'clock on a Sunday afternoon. In the long train of the funeral cortège were three cars laden with more than 200 wreaths. King Louis, Wagner's generous and beneficent patron, was unable to be present; but the next day made a sad pilgrimage to the tomb, placing the floral offerings thereon with his own hands, a touching tribute from royalty to true genius. During the procession from the station at Bayreuth to Wahnfried, Wagner's residence, the funeral march from "Siegfried" was played, and the Lieder-Kranz of Bayreuth sang Wagner's composition written for the funeral of Weber.

Wagner was buried in the tomb he had prepared for himself in the garden at the back of his house. It is touching to note in connection with this sad ceremony, that just in front of the tomb was the grave made by Wagner for his faithful dog that was poisoned, and the musician had marked the spot by the simple inscription: "Here Russ lies and waits." Both master and hound are now removed from sight, but the memory of the one is as imperishable as the fidelity of the other.

Wagner's influence as regards his work and writings is widespread, and, to my mind, ever increasing. We even see a veteran like Verdi inexpressibly tinged if not saturated with this influence, and such works as "Aïda" and "Otello" show us that, although the Italian composer has not forgotten his own legitimate school, with its broad and happy melodiousness, yet he has in the evening of his life been straying in pastures new, and is not above learning a thing or two when it is worth knowing. Professor Stanford is, to my thinking, a most able and vigorous exponent of the principles and traditions (if so young a school can have the latter) of the Wagnerian system. In Germany the performance of Wagner's works means for the management of a theatre or opera house pecuniary success, and in France there is a steady and increasing demand for excerpts from the composer's works.

In England, this unmusical and much-found-fault-with country, Wagner at the opera house does not mean money, and we are reduced to Italian versions of the smaller works in order to ensure even a moderate amount of success. At the Richter Concerts and Henschel's Symphony Concerts people cannot have enough of Wagner; why, I don't know. I suppose there's a good deal of fashion mixed up with it, for I am morally certain that the English do not appreciate and cannot understand Wagner or his works. That is just where Wagner fails; his music-dramas are grand, they are colossal both in design and treatment, but we must have the whole thing complete—music, scenery, and all accessories of a like nature; or else, as a rule, we don't understand them. Wagner wants us to study his works, to think deeply about them, to prepare our minds for their proper reception, and that is just what the majority of English people don't like doing.

Of course, some of Wagner's music does well by itself, and I shall never forget the impression produced upon me on hearing the "Walkürenritt" performed at the Albert Hall under Wagner's direction. If ever dramatic action was embodied and personified in music, it may here be found in unparalleled force; and I should question whether in the whole history of music so vivid and startling a presentment of a pictorial image has ever been made simply by orchestral means. All such attempts to familiarize the English people with the works of Wagner, as, for instance, the performance of a whole opera on a grand pianoforte, with a small company of selected singers, are worse than useless, and disgust not only the uninitiated, but also all those who respect and reverence the memory of so great a master. I would also deprecate all such utterances as "There are two great masters in music—Beethoven is the one, and Wagner certainly is the other." Beethoven is the one certainly, the one and only one, and he is like a familiar figure in a sacred narrative, a head and shoulders above his brethren. And I doubt not that amongst those who would readily subscribe to this opinion would be found, could he now have utterance, the Musician of Bayreuth, Richard Wagner.

DISCUSSION.

The Chairman.—I have now to invite the members of the Society to give us their opinions upon this interesting subject, which Mr. Cart has so clearly put before us, and I trust that we shall have a good discussion. Mr. Cart has told us that Wagner is not appreciated by the English people—*i.e.*, by the great body of the English people who are interested in music. I fear that at the first introduction of Wagner's music into England, the attempt to select short pieces from his works, which should be pleasing at a mixed performance, led to the production of the same pieces over and over again, because the number of such short pieces is so limited. The first great introduction of Wagner's music into England was made by himself and Herr Richter in those six grand performances, at the Albert Hall, of considerable portions of his more important works. Speaking as one of the general public, who has some little appreciation of music, I should say that there is a great fascination about Wagner's music. Before those Albert Hall performances I was not much interested and allowed the two first to pass, but went to hear the third performance, which I think included a considerable portion of "The Walkyrie." So struck was I with the power of Wagner's music, and so fascinated, that I was careful not to miss the other three performances, but heard them all, and they led me to regard Wagner as a very great composer and musician. Then came those larger and grander performances still of his works in a more complete form, his "Niebelungen Ring" and "Tristan und Isolde," and his other and better known operas, the repetition of which has shown that they at least are appreciated by the English musical world. I was greatly struck with one thing in connection with the Albert Hall performances. Wagner himself conducted during the first part of the performance, but was succeeded by that renowned leader Richter, who conducted during the second part. The change from Wagner to Richter was most marked in the effect produced on the performers. When Richter took the wand, it was as though he were playing every instrument in the orchestra; all the performers recognised and acted up to his masterly leading, and the effect was most startling and grand.

I will now ask you to give a vote of thanks to Mr. Cart for his interesting paper.

[A vote of thanks was carried unanimously].

Mr. Southgate.—I think there is very little I can say with regard to the paper which has been read, for one cannot in an audience of a mixed character such as is ours to-day take a paper of this character and analyse it and criticise it as it deserves to be. We should be thankful to Mr. Cart for

the facts he has brought under our notice. Probably many of us knew most of them before, but he has put them in a succinct form that will be useful for future reference. Although Mr. Cart has not indulged in much criticism of Wagner's works, there was one statement he made that to me was a little surprising—namely, that Wagner whistled the concertos of Beethoven. What a marvellous compass his whistle must have had! I should imagine if he could have performed those concertos at the concerts at Drury Lane or Covent Garden, where the whistling lady was one of the attractions, he would have quite extinguished the *siffleuse*. With regard to the popularity of Wagner in England, I think possibly Mr. Cart has underrated that to a certain extent. Among musicians, and in certain respects, his works are known and, I think I may venture to say, appreciated at their full value; moreover, there are certain of his operas which are, speaking generally, approved by the public. For instance, "Rienzi," "Lohengrin," "Tannhäuser," the "Flying Dutchman," and the "Meistersingers of Nüremburg" are liked. The public go to hear them, and my impression is that these fine works pay fairly well. But some of his other operas, such as the "Niebelungen Ring," "Tristan und Isolde," and "Parsifal," are productions which English musicians are hardly prepared to accept. As to the reasons for that, it would take too long to go into; there are many. Novelty, of course, is the first cause. We know geniuses are always in advance of the age, and it is some time before we get used to them, their novelties and peculiarities, and we know that it has always been so. But does not one cause lie in the *libretti* and the extravagant stories that he has chosen for illustration? No doubt, to the German mind, conversant as are these people with these legends, such must appeal much more forcibly than to us. They accept them as readily as we accept the fairy tales of our childhood; but they are not known to English people, and consequently there is a certain amount of want of sympathy with the stories, especially in their lack of natural human action. Of course, we know that there are operas, such as Weber's, in which there has been to some extent supernatural, but still there is in most of these a certain amount of human, interest. Now, in the Wagnerian subjects there is little of such sympathetic interest. These mystic legends, which have come down to us from early ages, seem to appeal more to Germans than to English people, and I cannot but think that is one reason why these later works of Wagner have not found the favour his early operas did. Then, further, there is the question of his last and most peculiar style—a very large question indeed, and on which we could hardly come to any sort of agreement. I was very glad to hear that, in grouping

the two composers, Mr. Cart gave Beethoven the pre-eminence. He should rightly have the pre-eminence, though one can hardly compare the two composers together. Still, as he has mentioned them by name, I will make one comparison, and that is this: we must never forget that Beethoven was an all-round genius—he produced symphonies, quartets, quintets, pianoforte sonatas, operas, oratorios, and so on. Now Wagner's works rest practically on what he calls the music of the Art Drama; therefore we are justified in classing him only as a dramatic composer. When the two eminent names are mentioned together, I say that here Beethoven must have pre-eminence. To my mind a genius, especially in music, ought to show his genius in every branch of the art. It has been so with Bach, Mozart, Schubert, Mendelssohn, Schumann, and certainly with Beethoven; but Wagner will not stand the test, and so he can only rank as a *genre* composer. There was one remark which struck me as hardly accurate with regard to Berlioz being the author of the romantic school. I should say that Weber was the founder of the romantic school. I think "Der Freyschütz" was the first work in which that quality was so distinctly manifest. Weber had gifts greater than Berlioz in that respect, but, of course, Berlioz lived after him, and was able to do that with the orchestra which Weber never dreamt of. Still, Berlioz's works are certainly romantic. Some portions of his "Queen Mab" music are marvellous pieces of imagery, and his skill and genius in dealing with an orchestra are indeed extraordinary. I cannot but think that had Berlioz not lived and given us the wonderful orchestration he has written, that Wagner could never have done the great work we all admit he has accomplished in the realms of orchestral music.

Mr. WEBB.—I would remark that the popularity of Wagner must be accepted as an undoubted fact, even by unmusical people having little or no knowledge of music. The reason for this is difficult to discover. Wagner's music is not easy, it is not always melodious, and it is not easy to follow. The only thought that has occurred to me with regard to the reason of its popularity is that it is thoroughly artistic, that it is real and earnest, and that it more thoroughly expresses the emotions than that of any other writer. On the other hand, I think perhaps we attribute too much to Wagner. There are other writers, such as Scharwenka, whom I think we ought to consider. I doubt whether a hundred years hence Wagner will be credited with such great genius as very many attribute to him now.

Mr. C. E. STEPHENS.—I think it is hardly fair to English people to say we do not appreciate Wagner, because he is evidently now quite in the ascendant in popularity. But there

may be one reason, perhaps, which I should have liked to hear Mr. Cart deal with, with regard to Wagner's slower advancement than would otherwise have been the case—and that is the almost superhuman demands which his works make on executive power. Anyone who attended the performance of the "Niebelungen Ring" will remember the superb effort of Madame Vogl in the part of *Brünnhilde*, which makes unreasonable demands on human resources. When an orchestra of some hundred musicians were playing their loudest, Madame Vogl towered above them all in splendid self-abnegation on behalf of the master; it was evident that that actuated her. But that is a sort of thing which cannot continue for ever; artists are, after all, mere flesh and blood, and they really cannot bear, I think, such very heavy demands as are made upon them by Wagner's works. I do not say a word in depreciation of the music of Wagner, but I say that the very great difficulty of its execution stands very much in the way in this country, and in others too, of its being appreciated. People show their readiness to appreciate the works of Wagner, but their extreme difficulty hinders their more rapid advancement. I cannot admit that England is behind any other country in appreciating what must be considered the genius of Wagner.

Mr. Herbert.—I should like to call attention to three points of Mr. Cart's address. First, he thought all great musicians had bad tempers; but as against that I would think of Haydn, Mozart, and Mendelssohn. Then came a statement that the acts of great geniuses were to be judged by a different standard from the rest of the world, *apropos* to Wagner seducing his friend's wife. There I differ from him entirely. And in speaking of great musicians, he said that Beethoven was the first; but I think Mr. Cart forgot Sebastian Bach. I am a most uncompromising enemy of Wagner in every possible way, but at the same time I admit that I came to the task twelve years ago (in 1878) prejudiced; for all I had heard abroad from professional musicians, and all I had read in his works certainly prejudiced me against him. To mention one or two instances, he said that the music of "Don Giovanni" would one day not be worth the paper on which it was written. After that he could not, by any possibility, find any sympathy from me. Then there was the matter of the pamphlet containing the attack on Mendelssohn and Meyerbeer, and the rest. In fact, on the moral side, Wagner's character was such as to prejudice me very much against his compositions. I admit it. Pougin says, in the supplement to his Dictionary, how difficult it is—almost impossible—to separate a man from his compositions, and there I entirely agree with him.

Mr. Southgate.—It is impossible to hear what Mr. Herbert

says without feeling in unison with it; but, after all, we are only called upon to judge of Wagner's music, not of his morals. I think we must try and test his music alone, forgetting everything else. If we remembered the other things he has perpetrated, the Bayreuth master would undoubtedly be condemned by all right-minded people; but one has simply to judge by his music and estimate the artistic effect he has produced. I think we can only look at him in that light. His offensive attacks on Rossini, Mendelssohn, and Meyerbeer, and others of whom he was jealous, or not in sympathy with, were so ridiculous that no doubt he did himself a great deal of harm by them. Owing to outside matters of this kind it is very difficult to get people to look at his works in a fairly impartial spirit.

The Rev. H. CART.—As regards the statement that Wagner whistled the concerti of Beethoven, I am not responsible for that, I was simply quoting the words of Dorn, his friend. I am afraid I was misunderstood with regard to the unfortunate second marriage, because, really, from my position, I could not advocate any such thing. I hinted that it would have pleased pupils of the school of Mrs. Mona Caird, and I do not see how it could be supposed that I defended it. Mozart has been mentioned as a good specimen in the matter of sweetness and good temper, but I have reason to doubt that altogether. I think Mozart occasionally attacked people, as also did Wagner. Of course, I am quite ready to admit with anyone that Wagner did sometimes make himself thoroughly ridiculous: his vanity was, to my mind, a most contemptible, childish thing. I was very pleased to hear Mr. Southgate say that we were to regard him so far as his music goes, and let us judge him by that standard. As regards the difficulty of his works, that cannot be gainsaid in any way. They do demand superhuman efforts, and it is a misfortune that it is so, for that will be one reason to prevent their ever becoming popular in the sense of their being appreciated by the masses.

MARCH 3, 1890.

MAJOR G. A. CRAWFORD
IN THE CHAIR.

THE FLAT, SHARP, AND NATURAL.
A HISTORICAL SKETCH.

BY FREDERICK NIECKS.

THE history of the flat, sharp, and natural is not a dull record, but a tale full of stirring incidents. If my narrative does not succeed in engaging your interest, in stimulating your curiosity, and in now and then sending a thrill of excitement through you, I have failed to do justice to the noble subject of my choice. These remarks may lead you to suppose that I am going to speak of the human flats, sharps, and naturals of our profession. This, too, is, if not a noble, certainly an interesting subject; but it is not the one of which I intend to treat on this occasion. My subject is the origin, rise, and vicissitudes of the musical signs that raise and lower natural notes and restore raised and lowered notes to their natural state. No doubt most people would suspect such a history to be dull; but nothing is dull if only we go deep enough into it. The subject in question is certainly not an exception to this rule, which could be confirmed by the study of hundreds of the apparently dry details of our notation. It is with these details as with the humble constituents of society; with the flat, sharp, and natural as with those lowly neighbours of ours whose lives seem to us an unbroken level desert. How great is always our astonishment when chance allows us to get a glimpse of what is hidden behind the plain, prosaic exteriors, and we discover loves and hates, hopes and disappointments, joys and sorrows, aspirations, successes, and failures—in short, at least as much romance as in the lives of the great and mighty. Well, let us try to get a glimpse of what is hidden behind the plain exteriors of the humble friends now under consideration.

The flat, sharp, and natural have a common origin, and this origin is the small letter *b*. If there were no direct evidence, this might be inferred from the mediæval names of these signs, which were respectively for the flat, *b rotundum*, round

b; for the natural, *b quadrum* or *quadratum*, square *b*; and for the sharp, *b cancellatum*, cross-barred *b*. But as there is direct evidence, we need not have recourse to inferences. John Cotton, who in the latter part of the twelfth century wrote a treatise on music, informs us that the oldest musicians, that is of the Middle Ages, gave to the monochord, or, as we of the nineteenth century would say, had in their system, only fifteen notes—namely, the diatonic notes from the great *A* to the second *a* above it. "There was neither added Γ," he says, "nor inserted the *b*, which we call round or soft *b* (*b rotundum vel molle*), but which by the Greeks is called synemmenon, that is, conjoint. The moderns, however, who are more subtle in all things, recognised that the number of notes which had been used up to their time did not suffice for the execution of all melodies." * The first known writer who distinguished between *b* natural and *b* flat was Odo of Clugny, who died in 942; the *b* natural being indicated by a square *b* (♮), the *b* flat by a round *b* (b).† The famous Guido of Arezzo, who exercised so great an influence on the music of the Middle Ages, and on whom have been fathered so many inventions that had either existed before him or came into existence after him—as, for instance, the note Γ, our great G, and the harmonic hand—wrote about the second quarter of the eleventh century, in the second chapter of his "Micrologus," as follows: "The notes of the monochord are these: In the first place we put Γ, which the moderns have added. Then follow the seven low notes (*graves*), according to the alphabet, which, therefore, are indicated by capital letters, thus: A, B, C, D, E, F, G. After these the same letters are written again, among which, however, we place between *a* and ♮ another *b*, which we make round, whereas we make the other square, in this way: a, b, ♮, c, d, e, f, g. To these letters we add yet, but with different signs, the superacute tetrachord, in which we double again *b*, thus: $\substack{\text{a, b, ♮, c, d.}\\\text{a, b, ♮, c, d.}}$" ‡

In the eighth chapter of the same work Guido explains why the round b was introduced. "The round b," he writes, "which, because it is less regular, is also called the added *b* (*b adjunctum*), or the soft *b* (*b molle*), forms a concord

* *Johannis Cottonis De Musica*, in Vol. II. of Gerbert's "Scriptores ecclesiastici de musica sacra potissimum."

† "Præterea a voce sexta F. per quatuor divide, et retro ♮. aliam b. rotundam pone: quæ ambæ pro una voce accipiuntur, et una dicitur nona secunda, et utraque in eodem cantu regulariter non invenietur."—(*D. Oddonis Dialogus de Musica*, in Vol. I. of Gerbert's "Scriptores ecclesiastici de musica sacra potissimum.")

‡ *Micrologus de disciplina artis musicæ*, in Vol. II. of Gerbert's "Scriptores ecclesiastici." See also *Micrologus Guidonis*, translated and explained (Latin and German text) by M. Hermesdorff (Trier: J. B. Grach); and German translation by Raymund Schlecht, in *Monatshefte für Musik-Geschichte*, Vol. V., p. 135.

with F, for which reason it has been added, as F cannot form a concord with the fourth note above it, the ♮, on account of the discrepant tritone. But the b and ♮ should not be joined in one and the same phrase."

This is not all Guido says of the use of the round *b*, but we have not time to hear him out.

Thus far I have spoken only of the two *b's* as they occurred in the letter notation; now, what was done when they were written in the stave notation? The already once-cited John Cotton of the twelfth century, remarks with regard to this, that the two *b's* stand on the same line or in the same space, but that if *b* flat is intended, a round *b* has to be placed above the note in question.

The round *b*, however, was not only placed above, but also before the *b* natural that was to be lowered a semitone.

As musicians had found that a *b* flat was necessary for the satisfactory execution of their melodies, so they found before long that other modifications, sharpenings as well as flattenings, were required, especially in their harmonic combinations. It is interesting to note how the idea gradually dawned upon them, and how they struggled against the recognition of its true significance. For although they allowed these new notes to be used, they would not admit them into their system on equal terms with the other notes. The *b* flat had been thus admitted, but the other semitones obtained by flats and sharps came under the denomination "false music" (*musica falsa*), and at a later period, "feigned music" (*musica ficta*), and also, but more rarely, *musica inusitata*. We have here one of the most striking and astounding instances of self-deception—an instance of the human intellect eclipsed by a theory. We may well call it astounding, for more than 600 years were needed to eradicate the strange notion, which to us appears in the highest degree childish.

No less interesting than the self-deception of the theorists and their followers is the clever utilisation which the early musicians made of the two forms of their *b;* for the round *b* came gradually to be used with other notes besides *b* that were to be flattened, and a happy thought suggested the employment of the square *b* for sharpening notes. The forms of our natural and sharp are nothing but variations of the square ♮, and owe their existence simply to careless writing. By making the short vertical line of the square *b* (♮) a little too long we get our natural (♮); by making the two vertical lines of the square *b* quite or nearly equal, and the horizontal lines long enough to extend beyond the vertical ones, we get our sharp, the cross-barred *b*, the *b cancellatum* of the olden times. Both signs, the natural and the sharp, were concurrently used with the same meaning.

Although at a later period—but never generally—there was a distinction made in the use of them, it was not till the eighteenth century that these signs were thoroughly differentiated, and their powers strictly defined and established as we at the present day know and acknowledge them.

Now let us return to the mediæval theorists. Johannes de Garlandia, who probably wrote in the first half of the thirteenth century, is already quite on the modern standpoint in dividing all tones into semitones. He says: *Falsa musica* (which is very necessary for instruments, especially for the organ) arises when we take a semitone instead of a tone, or the reverse. Every tone is divisible into two semitones, therefore the number of the signs which indicate the semitone may be increased in all the modes."*

Walter de Odington, who wrote somewhat later, probably in the last quarter of the thirteenth century, does not go quite so far as Johannes de Garlandia, but he adds to *b* flat, which, as we have seen, formed part of the regular system, the notes *f* sharp, *c* sharp, and *e* flat, saying, the double *b* effects, according to the moderns, a double *f* and a double *e*, and the double *f* effects a double *c*, in order that for both perfect fifths may be found. He explains also how the raising and the lowering of a note a semitone is indicated respectively by a square ♮ and a round *b*, and adds: "The two *b's* belong to the monochord; the other alterations are called by musicians *falsa musica*, not because they contain anything dissonant, but because they are outside the disposition of the monochord, and were not used by the ancients." †

Philippus de Vitry, of the fourteenth century, produces an example with ♮ and ♭ on all lines and in all spaces.‡ Another writer of the fourteenth century, Johannes de Muris, says that the false mutations (*mutationes falsæ*—that is, the chromatic alterations other than the *b* flat) are contrary to the character of plain-song, but that it is otherwise with mensurable song (by which we have to understand "harmonic music"). He discusses also the question whether a semitone should be inserted between the low *A* and *B*, and remarks that this was done in the case of some artificial instruments, such as the organ, in which almost all the tones are divided into unequal semitones. But he thinks that this is not so useful for the human voice.§

* *Introductio Musice secundum Magistrum Garlandia*, in Vol I., p. 166, of Coussemaker's "Scriptores de musica medii aevi."

† *Fratris Walteri Odingtoni De Speculatione Musice*, in Vol. I., p. 215, of Coussemaker's "Scriptores."

‡ *Ars Contrapunctus secundum Philippum de Vitriaco*, in Vol. III., p. 26, of Coussemaker's "Scriptores."

§ *Johannis de Muris Speculum Musicæ*, in Vol II., pp. 294 and 271, of Coussemaker's "Scriptores."

The absence of the low B flat from the mediæval theory has its explanation in the then flourishing hexachord system, according to which series of six notes, with a semitone between the third and fourth degree, were started from the notes *G*, *c*, *f*, *g*, *c′*, *f′*, and *g′*. The *b* flat was required for obtaining the semitone in the right place in the hexachords starting from *F*; but there was no low *F* (only *f* and *f*) and hence no need for a low *B* flat. This was the theory. And the low *B* flat remained absent from the system for hundreds of years after the note was in practical use. Here we have another instance of the conservative propensities of the human mind. Or should we say, of the intellectual inertia of the musical profession?

There is a remark of Johannes de Muris which deserves to be dwelt upon for a moment or two—namely, that the chromatic alterations of notes are contrary to the character of the purely melodic plain-song, but not to the harmonic mensurable song. This distinction has to be borne in mind; it is of great importance. One of the greatest authorities on both these kinds of music, Franz Xaver Haberl, the editor of service books and of the complete works of Palestrina, delivers himself on this point of the following opinion: "As the Gregorian chant as such is always executed *unisono*, the laws for the formation of cadences in two-part counterpoint are not at all applicable to it, and there is no other rule than this: except a flat before *b*, in order to avoid the tritone, no sign of sharpening or flattening is allowable in Gregorian chant."

This is the view taken by one who belongs to the party that insists on a strictly diatonic execution of plain-song. But there is also a party that favours a certain amount of chromaticism. The question is one of taste rather than of history. No doubt plain-song was at first strictly diatonic, but as soon as chromatic notes came into use elsewhere they could not easily be kept altogether out of plain-song. If some resisted, others would succumb to the temptation. This is not only according to reason, but, I think, may be gathered from the contradictory and often ambiguous accounts that have come down to us.

Even if we grant the admissibility of certain modifications of the radically diatonic plain-song, there remains still a great difference between it and harmonic music with regard to the amount of accidentally sharpened and flattened notes, with regard to the amount of the so-called false or feigned music. *Musica ficta* has been said by an anonymous mediæval writer to have been invented on two accounts—out of necessity, and for the sake of beauty. In harmonic music dire necessity made itself naturally more strongly and more frequently felt than in the purely melodic plain-song, and also the desire for beauty, for a smoothing down of the sharp corners of diatonicism.

G 2

Musica ficta, says another mediæval theorist, has been contrived for the purpose of obtaining good consonances, and of avoiding bad ones. Franco de Colonia writes: "When the *discantor* cannot get useful consonances by right music (*rectam musicam*), he may at his pleasure make false music (*musicam falsam*)." These statements are too general to tell us much. Let us go for some particulars to Prosdocimus de Beldomandis, who wrote at the beginning of the fifteenth century: "As to the use of these signs—namely, the round ♭ and the square ♮, you must know that they are applied to octaves, fifths, and similar intervals in so far as these require to be enlargened or lessened in order to make good consonances of them if they be dissonant, because such combinations should be in counterpoint always major and consonant. But these signs must also be applied to imperfect consonances, such as thirds, sixths, tenths, and the like, as they require to be enlarged or lessened in order to make them either major or minor, for these combinations must be in counterpoint, now major and now minor. If you wish to know when they are to be major and when minor you must consider the degree to which you intend to proceed immediately after such an imperfect consonance, and then you must see whether the degree which you leave lies farther away from that to which you intend to proceed if you make this imperfect consonance major or if you make it minor. For you must take that which is less distant from the degree to which you intend immediately to proceed, be it major or minor, and you must make them such by means of the above-named signs—a major of the minor, or a minor of the major—according to the requirements of the case. The reason is no other than a more pleasing harmony. But as this more pleasing harmony results from it, this reason can be regarded as sufficiently convincing. For if it belongs to the nature of the imperfect to strive after its perfection, which cannot be otherwise than by its approach to the perfect, the conclusion is that an imperfect consonance becomes the more perfect the nearer it approaches a perfect consonance, and also that thereby a more pleasing harmony of the song arises."* And then Prosdocimus de Beldomandis gives the following example:—

* *Tractatus de Contrapuncto*, in Vol. III., p. 199, &c., of Coussemaker's "Scriptores."

This is a very clear, simple, and comprehensive doctrine, which, however, raises a number of uncomfortable questions. Did it correspond to the prevailing practice? And, if the practice corresponded to the doctrine in the first quarter of the fifteenth century, did it do so in the remaining part of this and in the sixteenth century? And, further, if the practice of Italy corresponded to it, did that of other countries do so likewise? Unfortunately, answers to these questions are not forthcoming, for no other theorist before or after Prosdocimus de Beldomandis has been so outspoken as he. Now, one unacquainted with the history of music might here ask: Why make so much ado about theorists and their opinions? Have we not works of art in which both the theory and practice of their time and country must be embodied? Ah, here is the rub. The old compositions embody these things but very incompletely, as the necessary accidentals are either entirely wanting or imperfectly indicated. Nay, not only were the necessary accidentals omitted, but accidentals which had no business to be there were sometimes introduced—namely, for the purpose of warning singers not to sharpen or flatten notes in circumstances where they were accustomed to do so. Imagine the stupefaction of an uninitiated modern in coming across an *e* with a sharp and an *f* with a flat in those venerable works of the past! Even when the Italians and the French had become a little more liberal in the use of accidentals,* the Netherlanders and Germans kept true to their old reticence, and when works published in the former countries were reprinted in the latter, it was not an uncommon thing to omit the accidentals of the original print.† In an Italian manuscript of the fourteenth century occur the words, "False music ought not to be indicated" (*Non debet falsa musica signari*); and the Italian Pietro Aaron says in "Il Toscanello in Musica," the first edition of which appeared in 1523: "Accidentals are not needed by learned and practical singers, but are inserted only for inexperienced and unintelligent ones." In fact, the musical profession of those days, to all appearance jealously guarding the secrets of its craft, reminds one of what is told or fabled of the mason brotherhoods of the Middle Ages. The object of the accidentals, which the composers wholly or partially neglected to indicate and the singers had to supply, was a compromise between the modes (the ecclesiastical scales) and euphony. That this compromise is not likely to have been made on the same terms at all times, countries, and schools, is a proposition that needs no demonstration. Much

* The English composers were particularly careful in the use of accidentals.

† See in this connection and on the use of accidents in early times, articles by Robert Eitner in *Monatshefte für Musikgeschichte* III. (1871), 133; XIX. (1887), 20; XX. (1888), 75.

has been learned and much will be learned by carefully gathering and putting together the bits of information scattered here and there, the hints in the treatises of the theorists, the occasional, real, and cautionary accidentals in the works of the old masters, and the practice of the composers who wrote in German tablature, where accidentals received more attention. Nevertheless, it is hardly to be expected that editors of works of the Middle Ages and of the sixteenth and part of the seventeenth centuries will agree much better in the future than they have done in the past. The existence of the compromise will no longer be denied by any reasonable man, but there will remain open the question of what nature that compromise is, which side, the modes or euphony, is to be favoured, what shall be the amount of accidentals allowed in each individual case.

I shall now quote what Dr. Carl Proske, the editor of "Musica Divina," says on the subject of signature and accidentals. His conclusions with regard to these latter were arrived at by a thorough study of a manuscript collection of sacred music made in the sixteenth century for the Duke of Altemps at Rome, which was carefully prepared for practical use by the addition of accidentals, the additional accidentals being distinguished from those of the composers by being placed above the notes. "The old writers," says Proske, "did not require any chromatic sign in the signature of their modes in their natural position, but put in the signature a flat when they transposed them a fourth higher. Another essential signature of this kind could, according to the laws of those modes, never take place. Now, there frequently occurred in the modulation of a piece the employment of accidental intervals (♯, ♭, ♮), in the indication of which the old writers, otherwise so correct, proceeded in a very imperfect and uncertain manner. To be sure, they saw in such a raising and lowering of the intervals, in so far as they were not demanded by the nature of the modes, something extra-essential, and consequently called the signs used for that purpose accidentals, and the practical carrying out of them *cantus fictus*. Now, some, especially in the earliest times, omitted altogether the insertion of such signs; others inserted here and there a ♭, but avoided the indication of the requisite ♯ (diësis); later on these signs came more into use (the ♯ was generally substituted for the ♮), but a normal completeness of their indication is almost nowhere to be found. For the singers of the earlier times the want of the indication may have been less felt, for they possessed a thorough knowledge of the melody and harmony of the old tonal system, and could ascertain from the laws of solmisation and the harmonic modulation [*Ausweichung*] (the modulation of our modern modes is not applicable to this) a correct use

of the accidentals." He then gives four rules for the supplying of the necessary accidentals. Here they are in an abbreviated form. (1) and chiefly: The perfect cadence at the end of a piece, and the imperfect ones occurring in the course of it must be always preceded by the leading note. (2) To avoid false relation, the augmented fourth and diminished fifth have to be modified. There are, however, frequent exceptions to this rule. (3) When in the scale of *C* the note *b* is preceded by *a*, and descends immediately after, this *b* is to be flattened, especially if it returns to *a*. The same takes place in the scale of *F*, with one flat in the signature, where *e* is flattened in similar circumstances. (4) A minor sixth proceeding to the octave is often changed into a major one.

The temptation to pursue this subject farther is great, but I must resist it as I have already dwelt on it too long.

Proske's remarks have brought us to the end of the sixteenth century. But, before we proceed, we must look back for a moment, and take note of some of the details which we have disregarded in our general view of this part of our subject. Coussemaker's "L'Art harmonique aux 12e et 13e siècles," for instance, contains several harmonic compositions of the twelfth century in the signature of which, occupying the space of the note *f*, is a square *b*, formed like our natural and having the power of our sharp. In one case, one of the three parts of a composition has even two square *b's* in the signature, calling for *f* sharp and *c* sharp, whilst the two other parts have at the same time only one. Then we meet with an unexpected employment of accidentals. Some time after the occurrence of a *c* with a square *b* (♮) before it, the same note recurs with a flat. And the same occurs in another composition with *f*.* Now, that is not at all according to the general practice that prevailed soon after and down far into the seventeenth century. The rule being that the accidental applies only to the note before which it stands, and to the immediate repetitions of that note; if one or more other notes come between two notes of the same name, the accidental loses its effect. This rule remained in force even after the introduction of bars. At an earlier period, however, there was an exception to the rule; the round *b* being at times treated somewhat like our signatures, holding good till revoked by a square *b*. We find in the specimens which Coussemaker gives of the harmonic music of the twelfth and thirteenth centuries also the practice of placing an accidental not immediately before the note to which it applies, but before the preceding note, or even before the note preceding the preceding note. This practice, too, continued for a very long

* The flat having here the force of a natural, recalling the preceding accidental.

time. Lawes' "Ayres and Dialogues for one, two, and three voyces," published in 1652, supplies an example of a bar intervening between the acccidental and the note to which it applies, that is to say, the accidental stands at the end of one measure and the note at the beginning of the next. To return to Coussemaker and his early specimens, we meet in them with a peculiarly shaped flat, being somewhat like a square *b*, with three sides of the square leaning downward on the right side, thus: ♭ This is, with one exception, the most striking of the numerous but generally slight variations of the form of the flat I have seen. The exception I found in a manuscript volume in the British Museum containing "In Nomines and other solfainge Songes," by Taverner, Tye, Mundy, Philipps, Byrd, and others. It might be described as an angular capital B with an elongated vertical line, thus:—

If the Latin treatise of the thirteenth century included in the "Histoire de l'harmonie au moyen age" is correctly printed by Coussemaker, the writer used besides the flat both the natural and the sharp, and used these latter in the same sense. For we find the note *b* with a square and with a cross-barred *b* before it, and so we do *f*. One of these signs is revoked by a round *b*.

A composition of the thirteenth century, a Rondeau, "Fines Amourettes," by Adam de la Halle, is interesting for the form of the sharps it contains. Ambros says in his History that the sharp had here this form ✕. But that statement is not borne out by Coussemaker's fac-simile, where the sign presents itself thus ♮, and thus ♯. There is a still more interesting form of the sharp (Plate xxxvi.) in a fac-simile of a composition of the fourteenth century. It shows clearly how the square *b* (♮) became a cross-barred *b* (♯). The form of it is this, ♮.

The old form of the cross-barred *b*, the one that is identical with our sharp, was subsequently supplanted by the double St. Andrew's ✕, I suppose because this latter stood out more boldly from the stave. In the sixteenth, seventeenth, and a great part of the eighteenth centuries, this form of the sharp was the one commonly used. An exceptional form of the sharp—namely: XX—is to be found in Palestrina's "Hymni totius anni," printed at Rome in 1589. In Henry Purcell's "Sonatas of three parts," printed in 1683, a sharp like ours is used, but with larger and more slanting cross-bars, thus ♯

The square *b*, our natural (♮), fell into disuse. The composers either used only the flat and the sharp, or used also the

natural, but to a limited extent. The limitation, however, was not always the same. Some used it only in connection with *b*, others also with *f*.* The distinction made in these cases between a square and cross-barred *b* is explained in the third volume (page 30) of Michael Prætorius's "Syntagma musicum," published in 1619. From this writer we learn that the square *b* is properly placed before the *b* flat in the transposed system when this note has to be raised in order to obtain a perfect fifth to *e*, and before *f* in the regular, non-transposed system when this note has to be raised in order to obtain a perfect fifth to *b*. The raising here required is equal to a full semitone, whereas the raising required for the change of a minor third or sixth into a major is less than a semitone. Our use of the square *b* (♮) as a natural, as a revoker of flats and sharps, cannot be traced farther back than the end of the seventeenth century, and was not generally established till about the middle of the eighteenth.

As we have already seen, the old composers put, as a rule, no sharps in the signature and no more than one flat. But there were occasional exceptions to this rule. In addition to the early examples cited by me, I shall mention two of the first quarter of the sixteenth century, cited by Dr. Hugo Riemann in his "Studies to the History of Notation"—viz., Josquin's "Le Serviteur," with two flats, and Okeghem's "Prennez sur moy," with three sharps. The manuscript volume of which I spoke a little while ago supplies likewise examples with two flats.

In the second half, and more markedly in the last quarter of the sixteenth century, the composers began to be more liberal in the use of accidentals. And this was the case not only with rampant chromaticists like Gesualdo, Prince of Venosa, whose music swarms with accidentals, but even with what we may call the classical composers of the time. Burney noticed the first A sharp in a composition by Orlando Lasso published in 1655, and the occurrence of A sharp and A flat in the same movement in a composition by Cipriano de Rore. This change in the notation was simply an inevitable consequence of the great changes that were then going on in the nature of our art—the change from diatonicism to chromatico-diatonicism, the change from the old to the new tonality, the change from the polyphonic to the recitative and arioso style, and all the changes implied in the rise of the musical drama and the advance of instrumental music.

Ludovico Viadana, one of the leading spirits in the new movement, says in the preface to the "Cento concerti ecclesiastici," published in 1602: "The greatest diligence has

* See what Adlung says on this matter in the quotation given farther on.

been used in indicating all the accidentals—♯, ♮, and ♭—where they are required, and the prudent organist [whose duty it was to execute the thorough-bass] ought to be careful to observe them." Having pronounced the word thorough-bass, *basso continuo*, I will remind you in passing of the fact, well known to you, that when a minor third was required in the harmony, it was indicated by a flat above the bass note, the major third being indicated by a sharp. This was a general practice. But we find in Viadana a practice which became less general. An accidental applying to the bass note itself he placed before it, an accidental applying to the third of the unwritten harmony he placed sideways, somewhat to the left of the bass note, and on the line or in the space where the third would be noted.

But although Viadana is particular in indicating the accidentals, this had not yet become the general practice. Michael Prætorius wrote in 1619 as follows: "The cross-barred *b* (♯) and the round *b* (♭) were either not at all or very rarely marked by the chief and most excellent old composers in the places where they were nevertheless necessary. And even now there are composers who adhere to this practice and think it is wholly superfluous. They pretend that every singer and musician knows that he has to sing or play a perfect fourth and fifth when he meets with an augmented fourth and a diminished fifth, and a semitone in the cadences, and likewise a semitone when the melody ascends only one note above *la*. For this reason Philippe de Monte and other more distinguished composers will not allow their pupils to indicate in such cases the round *b*. But I am of opinion that it is not only convenient, but also in the highest degree necessary, not only for singers so that they may not be put out in their singing, but also for the simple town instrumentalists and organists who do not understand music, and are still less able to sing properly, and consequently, as I have myself often seen and experienced, do not know what to do in this respect; not to mention that the nature of the composition of composers is such that in some places these two chromatic signs have to be applied and in others must be disregarded. Therefore the best course would be if the composers were to write them down distinctly in all places where they are required, then it would no longer be necessary to ponder and doubt." Prætorius's remarks throw much light on the execution of music in his time, and whoever takes up the compositions of Frescobaldi, the great organist and composer of the first half of the seventeenth century, cannot fail to sympathise with the view expressed by the German writer. For they contain many sharps and flats, but not enough, and we of the nineteenth century are at a loss

what quantity we may and ought to add. Let us hear what Haberl, the editor of a collection of pieces by that composer, has to say on this head: "A much debated question in the case of Frescobaldi is that of the so-called accidentals (♯, ♭, and ♮) that are not marked, but were probably executed by him. Only in some obvious places have I indicated them by small signs above or below the notes in question. Some passages and harmonic combinations appear hard and unbearable, but they are not improved by accidentals, and false relations as well as chromatic dissonances were at that period by no means unheard of."

Every age is of course a period of transition. In the matter of flats, sharps, and naturals, the seventeenth century was this in the highest degree. Things were in an unsettled state and no serious attempts were made to settle them. No doubt some things were settled, but these were exactly those that required to be unsettled. Let us take a look at one or two things.

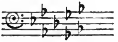
Burney tells us that Carissimi never wrote a sharp, and never more than one flat in the signature, even though the keys demanded several. The same may be said of many of his contemporaries, the younger as well as the older, not to speak of his predecessors. It holds good of Cavalieri's "Rappresentazione di Anima e di Corpi," of Caccini's and Peri's "Euridice," of Gagliano's "Dafne," of Monteverdi's "Orfeo," of Cavalli's "Giasone," of Cesti's "La Dori," and other works. For instance, in the last-mentioned opera we meet with the keys of D major, A major, and B minor, and with B flat major and C minor; but in the keys with sharps there are only accidentals, and in the keys with flats no more than one flat in the signature. But key-signatures with more sharps and flats are to be found early in the seventeenth century, and especially later on—for instance, a composition with two sharps in the signature, by Adriano Banchieri, of the year 1603. For a long time the number of two sharps or flats in the signature was not exceeded *whatever* the key might be. Thus we find in Alessandro Scarlatti's Opera, "La Rosaura," produced about 1690, A major with two sharps. But we find there yet other inconsistencies: D major with two sharps, but B flat major with one flat; D, G, and C minor with a flat less, and E and B minor with the correct number of sharps in the signature. By and by three sharps were sometimes put into the signature. But as late as 1728, the composer and theorist, Heinichen, wrote that the fourth sharp in E major was *rarely* put into it. And in the same work he complains of the incorrect notation of the modes by the omission of the essential major seventh and minor sixth. Most of our dictionaries and other books of information are silent on this

interesting point in the history of notation, and the few that take notice of it make inadequate, if not absolutely misleading, statements. One tells us that the last flat or sharp was frequently omitted; another that frequently one sharp was omitted; and a third, that in the minor keys the composers placed one flat less in the signature. The fact is, that the signature of the major as well as the minor, of the keys with sharps as well as the keys with flats, was often defective, and that there was no generally accepted system in this defectiveness. That there was no system may be proved by the following particulars. Couperin in his "Pièces" of 1713, writes the signatures of the major keys correctly, but puts one flat or sharp less in those of the minor keys. Taking up Pepusch's score of Corelli's Sonatas and Concertos, we find G, D, A, E, and E flat major, with one sharp or flat less; but F major with one flat, D major with two sharps, and B flat major both with one and with two flats. As to the minor keys, E, B, F sharp, and D minor are correctly marked; but G and C minor have one flat less, and F minor two flats less than they ought to have. Turning over Corelli's Op. 5, which is not contained in Pepusch's score, we find the following variations: D minor with one flat, A major both with two and with three sharps, and B flat major again with one flat. Some Concertos of Vivaldi's have in the keys of G, D, A, F, and B flat major, E, B, and D minor, the full complement of sharps and flats, but one flat less in E flat major and G minor. Again, in a book of Concertos by Giovanni Matteo Alberti, we come on F major with a flat, on G major without a sharp, on D major with two sharps, and on B flat major without the second flat; on E minor with a sharp, and on D minor without a flat. The signatures in Torelli's compositions are equally incalculable. Flying in desperation to the theorists, I thought, after much searching, that I was going to get what I wanted in a book published in 1708 by Friedrich Erhardt Niedt. Alas! another disappointment was awaiting me. Here is what I found: A major with three sharps, E major also with three sharps, and B major with four; E, B, and D minor correctly marked, and G, C, and F minor with one flat less. Gentlemen, I invite you to evolve a theory out of these facts; I, myself, feel constrained to admit my incompetence, and I need hardly add that I do so with the greatest possible reluctance. This unsatisfactory state of matters came to an end, roughly speaking, about the middle of the eighteenth century, but many composers had before then adopted a better practice; some, on the other hand, continued for some time yet to pursue their evil courses. A pleasing contrast to all this confusion is to be found in the eighteenth edition of John Playford's "Introduction to the Skill of Musick," of the year 1724,

where the keys given have the correct signatures; but the number of keys given is limited, comprising only the keys with one, two, and three sharps and flats, the major key with four sharps, and the minor key with four flats, of which E major and F sharp minor are said to occur only sometimes. As to the other keys, the author remarks: "There may be more thought on to puzzle young beginners, but not of any use, here being variety enough to please the ear."

In connection with key-signature, one peculiarity has yet to be mentioned—namely, the repeating of the sharps and flats if more than one note of the same name was to be found on the stave, the space below and above being generally included, sometimes also the first ledger line:—

As long as composers did not write in keys with many sharps and flats, and did not even mark every one of the few in the signature, this accumulation was unobjectionable—nay, even praiseworthy; it was otherwise when keys with more sharps came to be used, then a state of matters arose that was akin to the most terrible species of nightmare. Here are examples of the signature of E flat minor and C sharp major from Mattheson's "Great Thorough-Bass School" of the year 1731:—



Here has also to be mentioned that the place of the signs in the signature was not fixed as it is now—for instance, the sharp for the note *f* stands sometimes in the first space instead of standing on the fifth line, the sharp for *g* on the second line instead of in the first space above the stave. In short, the succession and position of the several sharps and flats was variable.

I spoke of composers not writing in keys with many sharps and flats. Saint-Lambert, in his "Principes du Clavecin" of 1697, says there were only three scales with sharps—G, D, and A major. And Mattheson wrote so late as 1731 that he had never seen a piece in E flat minor, and from another remark it appears that, if he had seen one in G sharp minor, it must have been a great rarity. You remember the quotation bearing on this point which I made from Playford's "Introduction."

The placing of accidentals *in the course of a piece* was no less curious than the placing of sharps and flats *in the signature*. "Parthenia, or the Maidenhead of the first Musick that ever was printed for the Virginal," the date of publication of which is 1606, shows accidentals placed before, below, and

above the notes. This was not an exceptional proceeding. Christopher Simpson does the same in "The Division Violist" of the year 1667. And Saint-Lambert, as late as 1702, writes that they are placed generally before, sometimes above and below, but never after the notes to which they apply. However, in Lock's instrumental music to *The Tempest* we find also accidentals placed after the notes to which they apply.

The long-obtaining practice of permitting the accidental to be separated from the note to which it applied by one or more notes, and of the occasional occurrence of an intervening bar, has already been mentioned.

Among the matters which the first half of the eighteenth century had to settle was the use of the natural. Adlung writes in 1758 that the natural was formerly used only before *b* flat and *e* flat. But mostly it was either not used at all or synonymously with the sharp—the flat reducing sharpened notes to their natural position, and the sharp doing the same for flattened notes. Loulié, a French musician, was the first who, to my knowledge, taught our use of the natural. He distinctly propounded in 1698 that a sharp raises a note a semitone, a flat lowers it a semitone, and a natural brings it back to its normal position. However, he immediately gives an example in which a flat revokes a sharp, and comments on this thus: "Note that a natural has the same effect." Indeed, many decades had yet to pass by before our use was established. For even in 1760, Rameau, who had for about thirty years been in the habit of using naturals in the modern way, writes in his "Code de Musique": "People are still pretty much in the habit of recalling the sharp by the flat and the flat by the sharp." Leopold Mozart, on the other hand, says nothing of the old style in his "Violin School," published in 1756.

In Loulié's time accidentals still applied only to the note before which they stood and those of the same degree immediately following. And this question has, even at the present day, not yet been settled. The usual rule in the latter part of the eighteenth century was that all the notes of the same name in the bar were affected after an accidental, and if the last note was one of these notes and the first note of the next bar of the same name, the latter was likewise affected. Later theorists limited this part of the rule to tied notes.

Next we must consider the introduction of the double flat and the double sharp. At first musicians had recourse to the next natural note—for instance, substituting *g* for *f* double sharp, *a* for *b* double flat. The learned theorist and excellent musician Mattheson tells us in the second edition of his "Great Thorough-Bass School" that in the first edition he had done this in the case of double sharps; but dissatisfied with this illegitimate proceeding, he now placed two sharps

before the notes in question. He does this because he has not the necessary type for the special sign which he had already proposed for the purpose—namely, a single St. Andrew's Cross. The composer Marcello opposed, in the preface to the third volume of his Psalms, the introduction of this sign, because it had already another signification, that of the enharmonic diësis. Leopold Mozart gives in 1756 two forms of the double sharp: ✛ and ✕. In 1758 we learn that its convenience had already made the latter the most fashionable form, and thus it has remained. Other forms had been proposed, but without finding favour. Here are two: ⋇ and 𝄪.

No special sign has been introduced for a double flat, although Mattheson proposed the Greek β. Sorge's proposal, made about the middle of the century (1745-7, in "Vorgemach"), of a special sign for a double natural failed likewise to find acceptance. It was this ♮.

To one other matter I must yet allude. The Germans had in former times no special names for flattened notes except *b* flat. They gave to *d* flat the same name as to *c* sharp, to *e* flat the same name as to *d* sharp, and so on. We read, for instance, in the theory books of the time, that the chord of E flat major consists of the notes *d* sharp, *g*, and *b* flat. How did this ridiculous custom come into being? You know there was a kind of letter notation called German tablature or German organ tablature. Well, in that system they had only one chromatic sign, a curved line or flourish added to the letter, answering to our sharp. So anyone writing in this notation had to substitute a sharpened note every time he wished to write a flattened one. This is the little-known solution of the riddle. Afterwards the syllable *es* was introduced to distinguish the flattened notes by name from the sharpened notes, which were already in possession of the syllable *is*. But this innovation was not brought about without difficulty, as the writings of the first half of the eighteenth century show us. Another curiosity are the German names of *b* for *b* flat and *h* for *b* natural. This is simply a case of mistaken identity. Even without going farther back and without studying old styles of handwriting, a black letter *h* cannot fail to strike you with its similarity to the square *b* and our natural.

I have not said all I wished to say, and a very great deal more than I could say is needed to make my slight sketch a finished picture. But I must conclude, having indeed kept you already too long; for though there was no lack of incidents in my account of the brothers flat, sharp, and natural, your faces, which I have been anxiously watching, showed me but too clearly that the thrills did not come off. Gentlemen, I thank you for the patient hearing you have given me.

DISCUSSION.

The Chairman.—Ladies and gentlemen, in opening any discussion on the lecture I will only make one or two remarks. I am perfectly certain that to any of us who have at any time indulged in the pleasure of investigating old music, printed or in MS., Mr. Niecks's remarks will be of very great use, for in printed music down to a comparatively late period we often find some of these curiosities of literature to which he has referred. I have often wondered how people in those days were ever able to read anything correctly at all, or to know at sight what the music was intended to represent. The habit of placing the accidentals at some little distance away from the note it was intended to qualify continued, I know, up to about 1700, for I have seen it in music of that date, and sometimes it is very puzzling to know what note is really affected, especially when the printer has made a mistake as well, and put the accidental in the wrong place. It was often placed not merely at the beginning of the next bar, but at the distance of several notes, and to that was sometimes added the difficulty occasioned by the notes not being in their proper relative places. I have seen a book printed in Germany in 1690, in which the treble finished at the end of the staff, while the bass, not being able to be crammed into its proper place, was turned over for some distance into the next staff, so that it was a very difficult matter to find out which notes of one part were intended to go with those of the other part.

Mr. C. E. Stephens.—I think we have to thank Mr. Niecks very much for this interesting paper, and we also understand his regret that he could not have extended it to considerably larger proportions, so as to embrace many questions which he has been utterly unable to touch upon. One point I should wish to refer to in music printing is the absurd method that until very recently prevailed of contradicting a double sharp or flat by putting a natural and a sharp, or a natural and a flat, after it. Of course that is like the old system in which, if there was a sharp in the signature and a natural was required, it was indicated by the use of a flat. That was common, even in Handel's time, for I have found it in his cantatas. If in the key of G, and F♮ were desired, it would be indicated by a flat, and, in the figured bass, curiously enough, it is put after the figure. But of all the absurdities of even quite modern times there is that mode of contradicting the double sharp and double flat, a point which I think is not much touched upon in the paper.

Mr. Niecks.—No, I did not mention the modern practice at all.

Mr. C. E. Stephens.—It seems to me the only thing necessary is to put the sign of what is actually required, and the thing then is plain and straightforward. It must be a matter of surprise in these days that we have not a single sign to indicate a double flat. It would be very desirable, but certainly not the sort of signs instanced by Mr. Niecks, which are most complicated. I remember a gentleman, an amateur, who some years ago looked upon these sharps and flats and double sharps and double flats as an invention of the ill-natured profession to try to bother the amateur; but he said it did not succeed in his case, for he never took the slightest notice of them.

Mr. Higgs.—I was reminded, when Mr. Niecks was speaking, of Handel's method of expressing a double sharp in a figured bass by the use of a single sharp. A double sharp never occurs when there is already a single sharp in the course of the piece. In the first song in the Oratorio of "Susannah," with its signature of four sharps, there is a modulation into G♯ minor, and it is expressed by a single sharp over the D♯—F𝄪 is of course intended.

Mr. Jacques.—I have to thank Mr. Niecks very much for the great profit and pleasure I have derived from his lecture, and I feel that when it is published we shall find it exceedingly useful. There are only one or two little things which struck me. He spoke about there being two parties with regard to the use of accidentals—those who favoured no accidentals before the notes at all, and those who wished some to be placed. I understood him to say that with those who did place them it was purely a matter of taste, and that there is no rule for it. Is that so?

Mr. Niecks.—I said it was purely a matter of taste, not a matter of history; that the matter could not be tested by historical facts.

Mr. Jacques.—I understood the chief rule they followed at that time was that the characteristic note of each mode was not to be interfered with; that was the point. For instance, in the mode beginning on D, it was necessary to have the major sixth, but you might have the seventh sharpened.

Mr. Niecks.—The major sixth is, as a rule, flattened whenever the sixth goes back to the fifth.

Mr. Jacques.—Is not that the Æolian mode?

Mr. Niecks.—Let us take the scale D, E, F, G, A, B. If the melody were to rise, say, from A, the fifth, to B, and then go back to A again, in that case the B would be flattened. But if the B were to rise and go on to C, then the B would remain natural. There seems to be no doubt about that, because all the theorists mention that particular point.

Mr. Jacques.—I think I first met with that theory in

Dr. Marx's "School of Composition," that the characteristic notes ought to be retained. I think he has given a whole table of them?

Mr. NIECKS.—Yes, that is quite correct.

Mr. JACQUES.—Then Mr. Niecks said he had no explanation to offer, and invited us to invent one, for the perplexing discrepancy in the placing of accidentals. May not that have been from a desire on the part of composers to conform, as they thought, to the mode? For instance, if we saw what we call D minor indicated by the note being flattened, was not the composer, perhaps, meaning to indicate the Dorian mode, what we call the first Gregorian tone? Is not that a possible explanation of the discrepancy that we find the same composer sometimes uses a flat in the D minor, and sometimes leaves it out?

Mr. NIECKS.—I do not think so. Our scales were already firmly established and fixed.

Mr. JACQUES.—I mean to suggest that they sometimes might have used our scale, the major or minor, and at other times they did not.

Mr. NIECKS.—I have often thought of that. But even if this theory should be found to hold good in the case of the minor scale, I do not see how it could be made to work with the major scale.

Mr. SOUTHGATE.—In the mention of *musica ficta*, about which there has been a great deal of discussion, it has always struck me that it is very doubtful whether there should be accidentals or not in the passages disputed over. There are two parties, one desiring that the accidentals should be used, and the other that they should be left out; we can hardly say whether they were required or not, and possibly there was no fixed practice. One cannot help noting that if from the chord of G minor you go to the chord of C, there is rather a desire to make the B flat (in the G minor chord) a B natural. Such is an example of questionable notation, difficult to settle in old music. We have examples of old music which has been reprinted, and you find theorists, and probably many of us, who doubt whether there should be certain accidentals in or whether there should not. Of course our ears have lost the old tonal feeling that the people who sang and wrote in those days had, and we are not well able to decide. It is certainly very much to be desired that these accidentals should be put in. With regard to the St. Andrew's cross sharp, I think it was used later than Mr. Niecks said. If my memory serves me rightly, in some of the earlier editions of Handel published by Walsh I think you will find that.

Mr. NIECKS.—Much later than that even.

Mr. SOUTHGATE.—That which interests me very much is

the old German Tablature. I lately had a very curious book in that tablature sent me from Berlin. It was an old book of organ music made for, or by, an organist of the name of Erasmus Hofer, and it had the date of 1601 at the end. The several pieces in it evidently consisted of the organ parts of Motets by Orlando Lasso, Vecchio, Rienero, and others, composed in four, five, six, seven, or eight parts, and all written in this curious tablature. I went to work to translate it, and found it a difficult task, but by perseverance and counting I found the key. One of the things which puzzled me more than anything else was that extraordinary method of indicating sharpened or flattened notes to which Mr. Niecks has called attention. It did seem a most extraordinary thing that the perfect fifth to A♭ should be D♯, and it puzzled me for a very long time; but at last I found that the Germans were not so perfect in their notation as we were, and that they were obliged to make one sign do for the E♭ and D♯, &c. It is very curious that that organ tablature should have lingered so very long in Germany. We had a tablature ourselves at a very early period, and we discarded it. There are some known examples of its being used as early as the time before the Norman Conquest, but in the time of Ethelred music was written on lines and spaces, so that we had got rid of our alphabet. But for other music, such as the viols, and the bassoon and flute, tablature was used down to the time of Playford. It is strange that the Germans should have kept up the old plan so much longer than we did.

Mr. Wesché.—I should like to know if Mr. Niecks has ever seen an instance of a double double sharp. I found one in a modern work—a Sonata for pianoforte and violoncello, in G major (Op. 25), by Jean Louis Nicodé—

It is not really intended to raise the note two whole tones, but only a tone and a half.

THE CHAIRMAN.—I think we must certainly pass a vote of thanks to our lecturer of this evening for his very interesting paper.

[The vote of thanks was carried unanimously.]

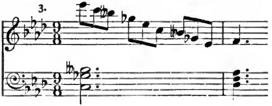
A NEW SIGN FOR THE DOUBLE FLAT.

The Assistant Secretary.—In the discussion on Mr. Niecks's paper read in March, on "The Sharp, Flat, and Natural," reference was made to the absence of a single sign to indicate a double flat, such as is used in the case of a double sharp. I have been asked to bring under the notice of the members of this Association two signs with that object, which have been invented by Mr. Ross, of Messrs. Novello's printing establishment, through whose hands our "Proceedings" pass when in course of publication. A very great deal of music being now printed from type, it is found that the double sign at present in use occupies so much space as to interfere with the symmetrical appearance of the music when thus set up, and Mr. Ross was therefore led to devise some sign which should obviate this disadvantage. The two signs which he has produced achieve this object, and in presenting them to you for your opinion, Mr. Ross hopes that approval from distinguished authority may lead to the general adoption of one or other of them. It is, of course, desirable that any new sign, in order to gain ready acceptance, should present to the eye some resemblance to the present double flat, and thus suggest that the note must be lowered from its normal position. It will be noticed that both signs fulfil this requirement. The following passages show first of all the present double sign and then the two signs invented by Mr. Ross.

1.

2.

3.



April 7, 1890.

CHARLES E. STEPHENS, Esq.,

In the Chair.

WHAT IS SOUND?

THE SUBSTANTIAL THEORY VERSUS THE WAVE THEORY OF ACOUSTICS.

By George Ashdown Audsley, F.R.I.B.A.

It is perhaps a rather startling question to put to the learned and accomplished members of such an Association as this—What is sound? All your lives long you have doubtless held very firm and clear convictions on the subject of Sound; and have trustingly accepted the theory which has obtained, one may almost say, since the time of Pythagoras, and which has, in our day, been fostered by all the great acousticians, and dogmatically taught by Professors Tyndall, in England, Helmholtz, in Germany, and Mayer, in America.

Until I put pen to paper and issued my "Review of the Old and New Theories of Sound" in the pages of the *English Mechanic and World of Science*, it is not too much to say that the existence of a modern theory of acoustics was all but unknown in Europe; it certainly was never openly submitted to the consideration of the English public. I am well aware that its existence has been known for some years to the three great acousticians I have named; and that they have been challenged to refute it, or, in face of it, to substantiate their beloved wave or "undulatory theory" of sound, shaken to its very roots by the results of modern thought and investigation. Notwithstanding this challenge by scientists as worthy of respect as themselves, they have neither admitted their knowledge of the modern theory in any public manner nor have they refuted it or done anything, in the face of its teaching, to fix their own theory on an unassailable basis. Nothing but a curious silence has been observed.

Does anyone present remember of ever having heard the professors under whom he has studied, or with whom he has come in contact during the last ten years, mention the fact that the truth of the wave theory was being seriously

questioned, or that it stood in the slightest danger of being completely shattered? I have never met with an individual who has answered that question in the affirmative.

Well, I have ventured to come before you to-day, just to tell you something about this new departure in acoustical science, and to briefly argue the case between it and the time-honoured and widely accepted Wave Theory of Sound. Let me ask, first of all, your kind and courteous hearing and attention, bearing in mind that such a discussion is nothing, and should be nothing, of a personal nature. I am going to consider simply a matter of science, as viewed under the obvious and natural phenomena of sound creation and propagation, and to endeavour to bring reason and common sense to bear on matters hitherto far too much dependent upon mathematical formula and misdirected and misconstrued experiments for their support.

To all musicians the subject is one of the deepest interest; and I can assure you all, that if the old wave theory, with all its mechanical impossibilities, is swept away, another will take its place of infinitely greater dignity and simplicity, for the musician will find his glorious art bound up with one of the great forces of nature, and in no way dependent upon a system of mechanically produced *sound-waves*, or a pulsatory motion of the air.

Let me say a few words by way of an apology for my appearing before you in the capacity of a speaker on the subject of acoustics. I am not altogether a stranger in this room, having had, during the last session, the pleasure of reading a Paper on matters connected with the Organ. Well, my apology is this: For twenty-five years I have studied matters relating to sound and its phenomena, and during that time have read all the leading text-books and treatises on the science of acoustics which seemed to throw any light on the subject of sound. Further than that, I have ventured to close those books and to think for myself—a very sinful thing to do in the eyes of dogmatic teachers—and occasionally have been rash enough, as some of my future remarks will show, to use the common sense the Creator has given me.

The result of this independent use of thought and common sense was a very strong doubt in the truth of the theory taught by our leading acousticians, and a very decided objection to their one-sided methods of conducting experiments in support of their views. How one-sided some of their experiments are, you shall have an opportunity of judging for yourselves. Whilst in the midst of the fog of doubt and uncertainty raised by the bad habit of using my own judgment, I heard of the new theory of acoustics founded by Dr. A. Wilford Hall, of America. I need not assure you that I lost no time in making myself acquainted with his

views, and testing to the fullest extent in my power the truth and reasonableness of the arguments advanced against the wave theory and in favour of his new hypothesis. Just as I had before, by the use of independent thought and common sense, doubted the truth of the wave theory, so did I now, by a similar process, accept the new or Substantial Theory of Sound as in all essentials reasonable, and compatible with the known and observed phenomena of sound. Subsequent study and careful investigation have convinced me that the wave theory is false and insufficient, and that Dr. Hall's theory is true.

This is the only apology I can offer for appearing before you on the present occasion, and for asking your kind and considerate attention to my following remarks. Whatever may be the fate of the theory I advocate, there is just one fact worthy of notice—namely, that you are listening to the *first Paper* on the substantial theory of acoustics ever read before a European audience.

I cannot help realising that I have undertaken a very venturesome task in essaying to prove, in one necessarily brief Paper, the falsity of the wave theory and the truth of the substantial theory of sound; and I need not assure you that I shall have to pass over much on both sides of the question which I should like to submit to your consideration, and which I am certain you would feel an interest in hearing and subsequently thinking out for yourselves. Perhaps, should my subject commend itself to your minds, I may be permitted at some future time to open it up more completely than it will be possible for me to do to-day.

It is advisable for the sake of some of my hearers, and it is necessary for my present purpose, that I should briefly outline the teaching of the wave or "undulatory theory," as presented in the writings of our greatest authorities, and this I now proceed to do.

I presume no one present will object to my taking Professor Tyndall as the most trustworthy exponent of the science of acoustics as commonly accepted and taught; and I can fancy your saying, not only that he is perfectly trustworthy, but that it is a piece of presumption on the part of anyone to call in question his teaching in the matter of sound. I shall have to do so, much to my regret, in a very decided manner and supported by proofs.

According to this great acoustician, "The sound of an explosion is propagated as a *wave or pulse through the air*. This *wave* impinging upon the tympanic membrane causes it to shiver, its tremors are transmitted through the drum to the auditory nerve, and along the auditory nerve to the brain, where it announces itself as sound.

"A sonorous wave consists of two parts, in one of which

the air is *condensed*, and in the other *rarefied*. The motion of the sonorous wave must not be confounded with the motion of the particles which at any moment form the wave. During the passage of the wave every particle concerned in its transmission makes only a small excursion to and fro. The length of this excursion is called the *amplitude* of the vibration."

From this statement it is obvious that the propagation of sound is solely a mechanical matter; whilst from the same teaching it might be argued that sound *per se* has no existence. We are apparently taught that what we know as *sound* is simply a sensation in the brain. We are distinctly told that what we realise as *sound* is caused by *waves* sent through the air by the purely mechanical action of a vibrating or exploding body, and by those waves striking upon our tympanic membrane and setting it into corresponding motion. Up to this point, however, and on this reading of Professor Tyndall's words, sound, as we know it, may be supposed to have no absolute existence; but when the vibrations so set up in the tympanic membrane are communicated to the auditory nerves, and by them conveyed to our brain, we instantly experience the sensation of sound. The definition of sound, as given by our leading acoustician, is certainly ambiguous; and one can almost sympathise with the American scientist, Professor Stahr, who, in criticising Dr. Hall's new theory, made the serious blunder of stating publicly in the columns of the *Reformed Quarterly Review* (July, 1883), that "sound is really a sensation, that is, the impression made through the ear and brain upon the mind."

Now it is quite certain that Professor Tyndall never intended to convey such an idea as this, for in doing so he would be laying an axe at the root of his favourite wave theory. This theory, as universally taught, says that sound is constituted of *air-waves*, each of which is formed of a condensation and a rarefaction of the air, not of a mental "impression" or "sensation" caused by such waves. As Dr. Hall, in replying to Professor Stahr's blundering attack, says: "We could quote a hundred passages from the highest authorities on acoustics to prove that (according to their wave theory) *sound* is that very *wave-motion* which travels through the air from the place of origin, or from the sounding instrument, to the ear and to the brain, where it terminates in producing the *sensation of hearing* as its effect. This *mental impression* is not *sound* at all, but is the final effect of sound upon the brain and mind. If it is ever called *sound* it is by a well-known trope called metonymy of speech, by which the effect is put for the cause. . . If sound is fundamentally but '*the impression made through*

the ear and brain upon the mind,' then that which produces such 'impression' by beating against the tympanic membrane and bending it 'in and out,' and which travels several miles from the sounding body through the air in the shape of 'condensations and rarefactions' as the wave theory teaches, is not sound at all."

Professor Tyndall says, in commenting on one of his illustrative experiments: "Thus, also, we send sound through the air, and shake the drum of a distant ear." He does not say, as Dr. Hall points out, "Thus do we send the *mental impression* through the air, and shake the drum of the distant ear, when the ear has first to be shaken, according to the wave theory, before the *mental impression* can exist!"

It is to be regretted that Professor Helmholtz is not much clearer in his language than our English scientist, for he says: "The motions proceeding from the sounding bodies are usually conducted to our ear by means of the atmosphere. The particles of air must also execute periodically recurrent vibrations, in order to excite the sensation of a musical tone in our ear. This is actually the case, although *in daily experience sound at first seems to be some agent, which is constantly advancing through the air and propagating itself further and further.*" It is a pity, for the sake of science, that this celebrated acoustician did not pay closer attention to the "daily experience" he acknowledges; for had he carried the thought that sound "seems to be some agent which is constantly advancing through the air" to its logical conclusion, little would, in all probability, have been left for Dr. Hall to do in connection with acoustical science; and his great work, "On the Sensations of Tone," as the scientific world knows it, would never have been written.

Professor Helmholtz, alluding to the "propagation of the sonorous tremor," and the "constant attraction of fresh particles into its sphere of tremor," says: "This is a peculiarity of all so-called *undulatory motions*. Suppose a stone to be thrown into a piece of calm water. Round the spot struck there forms a little ring of wave, which, advancing equally in all directions, expands to a constantly increasing circle. Corresponding to this ring of wave, sound also proceeds in the air from the excited point and advances in all directions as far as the limits of the mass of air extend. The process in the air is essentially identical with that on the surface of the water. The crests of the waves of water correspond in the waves of sound to spherical shells where the air is condensed, and the troughs to shells of rarefaction."

If time would permit I should like to follow Helmholtz through all his elaborate comparison between the behaviour of water-waves and sound-waves; but I must content myself by saying that after years of careful study of his teaching, I

most unhesitatingly affirm that no thorough or logical comparison can be instituted between the behaviour of *water-waves*, however generated, and the behaviour of *sound* as known to us by "daily experience."

Now, by the aid of a simple diagram I have prepared, I shall be able to convey to your minds some idea what sound-waves are supposed to be, according to the teaching of Professors Tyndall and Helmholtz.

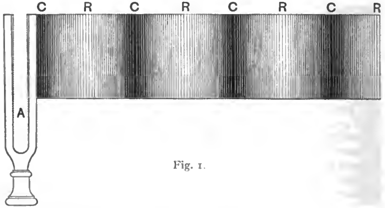


Fig. 1.

The diagram, Fig. 1, shows a tuning-fork, A, such as one of the large Kœnig forks on the table; and its prongs are shown advancing—"swiftly advancing," according to the usual expression found in acoustical text-books; how swiftly it will be my duty to state presently—and extending from one of its prongs is delineated a broad shaded band, intended to convey a graphic idea of the *sound-waves* sent off by the mechanical action of the prong into the surrounding air. How does the tuning-fork produce sound? I shall endeavour to give you the rational explanation shortly; but, in the meantime, let me give you the wave theorist's version of the matter. We are told by Professor Tyndall, if we want to understand this question, and "to picture to ourselves the condition of the air through which this musical sound is passing," we must "imagine one of the prongs of the vibrating fork *swiftly advancing;* it compresses the air immediately in front of it, and when it retreats it leaves a partial vacuum behind, the process being repeated by every subsequent advance and retreat. The whole function," continues the Professor, "of the tuning-fork is to carve the air into these condensations and rarefactions, and they, as they are formed, propagate themselves in succession through the air. A condensation with its associated rarefaction constitutes a sonorous wave." According to this teaching, and it fortunately is perfectly explicit, the whole function of the tuning-fork, with its prong

"swiftly advancing," is to carve the air into condensations and rarefactions. In our diagram, the condensations are indicated by the darker shadings, at C, C, C, C, whilst the lighter portions, at R, R, R, R, represent the rarefactions. The sound-wave is measured from condensation to condensation—from C to C.

To give full weight to what I have to say on the tuning-fork, it is necessary for me to add here a few words by Professor Helmholtz on this important acoustical instrument. He says: "Take a pendulum, which we can at any time construct by attaching a weight to a thread and setting it in motion. The pendulum swings from right to left with a uniform motion uninterrupted by jerks. Near to either end of its path it moves slowly, and in the middle fast. Among sonorous bodies, which move in the same way, only very much faster, we may mention tuning-forks." Now I must ask you to remember the two expressions used by Professors Tyndall and Helmholtz in speaking of the purely mechanical action of the prong of a tuning-fork. One speaks of the prong "swiftly advancing," and the other speaks of its moving "very much faster" than a pendulum. Of course, these scientists well know that the prong of a tuning-fork must advance swiftly and must move very much faster than any pendulum ever constructed, before it can "compress the air immediately in front of it," and "carve the air into condensations and rarefactions," which will create *sound-waves* and send them off in all directions at the velocity of 1,120 feet a second to "shake the drum of a distant ear." But neither of these teachers gives us any idea of what he understands the speed of the vibrating prong to be; and this is just a slight omission, for it is an important matter, as I shall now attempt to show.

In the first place, let me point out to you the clear teaching of the wave theorist with reference to the action of the tuning-fork in producing sound—he distinctly implies, if he does not put it in hard words, that nothing issues from the vibrating steel itself, yet he calmly speaks of it as a "*sonorous body*." Would not it be more logical to call it simply a *vibrating body*, seeing that it has to do mechanical work in *condensing* and *rarefying* the air and sending off *air-waves* at the velocity of, say, 1,120 feet in a second, before what we know as sound is created? Now let us lay aside these views of others, and do a little calm thinking and testing for ourselves. Here is a tuning-fork yielding the note C of 256 vibrations a second. What does it teach the careful experimenter, the unprejudiced reasoner, and the student given to using his common sense? It teaches him that whilst it pours forth a beautiful sound, it is as incapable of condensing the air in front of it, and of sending off air-

waves about 4 feet 4 inches long, at the uniform velocity of 1,120 feet a second, as a morsel of fluttering gold leaf. This statement doubtless surprises you, but what I am now going to add will probably surprise you still more.

This fork when properly bowed will continue to pour forth audible sound for a little over four minutes. The sound, as you know, gradually decreases until it is inaudible to the ear, and this decrease of strength is in accordance with the uniformly diminishing swing of the fork's prongs.

The remarks I am now going to make on the fork's vibrations, are based on the experiments carefully conducted by Captain R. Kelso Carter, late Professor of Higher Mathematics at the Pennsylvania Military Academy. Captain Carter used a Kœnig fork precisely similar to the one on the table. To one prong he attached a fine recording point; and then by drawing the fork whilst in vibration over a piece of smoked glass, he secured an accurate register of the swing of the prong during one minute; then, from a number of exceedingly careful measurements made with a powerful microscope, and by the aid of a micrometer showing the one 100,000th of an inch, the following results were obtained :—

	Amplitude of Swing.
After striking	$\frac{1}{20}$ inch.
,, 15 seconds	$\frac{1}{100}$,,
,, 30 ,, ...	about $\frac{1}{200}$,,
,, 45 ,, ...	,, $\frac{1}{400}$,,
,, 60 ,, ...	,, $\frac{1}{900}$,,

The greatest care was used to strike the fork each time with the same force; and a number of trials were made, and the lines traced were patiently measured under the microscope.

Describing his experiments, this scientist remarks :— "Before closing the experiment I measured a number of traces made when the fork had been sounding for some time, and the vibrations were entirely invisible to the naked eye. The one I will here record was carefully measured under a powerful glass, which plainly showed the waves in the trace. And let it be particularly noted that in this case the fork continued to sound audibly *after* marking the trace upon the glass, though much of its vibration was checked in making it. The amplitude measured was $\frac{1}{17,000}$th of an inch, which is precise to at least $\frac{2}{100,000}$."

Now, accepting this measured amplitude of the fork's prong whilst sounding audibly we find, as the prong vibrates 256 times in one second, that the entire distance travelled by it in one second is $\frac{256}{17,000}$ths, or, say, $\frac{1}{66}$th of an inch, or $\frac{60}{66}$ths of an inch in a minute of time.

From the general rate of decrease, which may be fairly

assumed from the measurements taken during the first minute of the fork's vibration, we may assume that the prong had been vibrating about two minutes when it recorded the complete swing of the $\frac{1}{17,000}$th of an inch. Should we think it necessary to run the calculation down through the full four minutes which the Kœnig fork continues to send forth audible sound, we may reasonably assume that at the end of that time the fork prongs are swinging through a distance of about the $\frac{1}{4,000,000}$th of an inch, or about the $\frac{1}{15,600}$th of an inch in a second of time.

It is quite unnecessary, however, to go one step beyond the measured swing of the $\frac{1}{17,000}$th of an inch, for, surely, there can be found no one with common reasoning powers who will maintain that a fork-prong travelling at the rate of only $\frac{1}{66}$th of an inch in a second can carve the air into sound-waves, or air-waves, formed of condensations and rarefactions; and that in moving at each swing the $\frac{1}{17,000}$th part of an inch in the 256th part of a second can send off such waves, measuring about 4 feet 4 inches from condensation to condensation, at the uniform velocity of 1,120 feet in a second of time.

Now you will remember that Professor Tyndall, in speaking of the action of the tuning-fork, says: we must "imagine one of the prongs of the vibrating fork swiftly advancing"; and then he asserts, "the whole function of the tuning fork is to carve the air" into sonorous waves, consisting of condensations and rarefactions. Can he, when he put these remarks in his well-known text-book, have been aware of the almost infinitesimal motion of the prongs whilst still sending forth audible sound—motion absolutely incapable of disturbing the air even to the distance of one inch from the prong? Surely not; for had he been aware of the facts of the case he could never have used the words "swiftly advancing" with reference to a body moving almost too slowly to be realised by the mind.

Further, in speaking of the tuning-fork's motion, Professor Helmholtz tells us that its prongs move like a pendulum, "only very much faster." He, of course, realises that the fastest pendulum ever made could, under no possible conditions, be expected to carve the air into sound-waves, simply because the air would refuse to be carved into condensations and rarefactions, and naturally elect to quietly flow round the moving body; and he also realises that if the pendular motion of the tuning-fork is to produce sound-waves, &c., it must move "very much faster" than the fastest pendulum ever set wagging by the hand of man. His great and unpardonable mistake lies in his not condescending to inform his readers and the scientific world generally just how much faster the sound-producing fork must move than the fastest known pendulum. You can, however, arrive at a

fair conclusion for yourselves in this important matter—make a pendulum with a weight and thread, and time its swings after measuring them. Then compare the results with the facts I have given you with reference to the vibrations of the tuning-fork. You will most certainly find that the latter are very much slower, and not, as Helmholtz affirms, "very much faster" than the motion of the pendulum. Professor Tyndall remarks—"When a common pendulum oscillates, it tends to form a condensation in front and a rarefaction behind. But it is only *a tendency;* the motion is *so slow* that the highly elastic air moves away in front before it is sensibly condensed, and fills the space behind before it can become sensibly dilated. Hence sonorous waves or pulses are not generated by the pendulum. It requires a certain sharpness of shock to produce the condensation and rarefaction which constitute a wave of sound in air." Now, are we expected to believe that a small tuning-fork prong, which oscillates the $\frac{1}{900}$th, the $\frac{1}{17.000}$th, or the $\frac{1}{4.000.000}$th of an inch, can generate sound by condensing and rarefying this elastic air which defies the large swings of a pendulum? I, for one, refuse to believe any such nonsense.

I have in the foregoing remarks endeavoured to show you the simple truth about the vibratory motions of the tuning-fork whilst it is producing audible sound; and, further, to impress you with the fact that its motions are far too minute to exercise any effect on the surrounding air, even to the distance of an inch from its prongs. All this upsets the theory that the sound we hear from the vibrating fork is constituted of sound-waves, as taught in our text-books; but it does not prevent our hearing the sound the fork is sending forth; nor does it directly inform us how or why the fork sounds, or what constitutes sound *per se*.

Before proceeding to the consideration of certain phenomena of sound, upon which the undulatory theory of acoustics is built up, I think it desirable to submit for your consideration the Substantial Theory, the claims of which I urge on the present occasion. I must do this very briefly, and, unfortunately, I must leave many important matters connected with it untouched upon in a necessarily short Paper like this. I shall first give you the definition of sound according to the new theory, and then quote a few words from the writings of the founder of the theory, with reference to the subject.

Sound is one of the primordial forces of nature; it is a substantial force, or an immaterial objective entity, governed by laws ordained and fixed immutably by the great Architect of the Universe. This form of force can only be generated or liberated from the force-element of nature by one means devised for that end—namely, vibration of the sonorous body itself.

Such is, briefly, what I believe sound to be; and I accept the definition as reasonable, perfectly consistent with all the observed phenomena of sound, and with "daily experience." You will remember the words of Professor Helmholtz, who says, although he accepts the time-honoured wave theory: "In daily experience, sound at first seems to be some agent, which is constantly advancing through the air and propagating itself further and further." How nearly this great scientist's "daily experience" had wafted his scientific reason into the haven of truth; but the waves, with their condensations and rarefactions, carried the frail and rudderless bark out into the stormy sea of false science.

Now let me somewhat enlarge upon the definition just given.

When any sonorous body is set into vibration, sound-pulses or pulses of substantial force element are released and sent off from it. Such pulses are generated by the interaction of forces in the sonorous body, and depend on the sonorous properties of the body. In certain bodies the force stored up in them by the mechanical action of setting them into the required state of vibration, is partly converted into heat and partly into sound-pulses: and the difference between the quantities of these two forces constitutes the difference of sonorous property in any vibrating body. The cohesive force and other forces present in the body control the action of the mechanical force exercised, converting some of such force into heat, and some into sound-pulses. To aid you in grasping what I have affirmed, I may remark that the pulses of substantial, but immaterial sound force, are analogous to electric discharges. Several of the common phenomena of sound fully support this hypothesis.

I shall now turn to the writings of the founder of the substantial theory, and briefly direct your attention to the reasoning which led him to reject the wave theory as false and untenable.

The Substantial Philosophy teaches and lays down as its "central and cardinal proposition," says Dr. Hall, "that every force of nature, as a *phenomena-producing cause*, must, in the very necessities of true science and of the relations of cause and effect, be a substantial entity or an objective existence."

Dr. Hall assures us that he found himself confronted, at the outset, with difficulties in essaying to reconcile such a radical assumption with the existing theories of science which teach that some of the most conspicuous natural forces, and the causes of observed phenomena, are the *mere motions of material particles*. He says: "To have admitted for a single moment the assumed basic facts of the current motion-theories of science—namely, that the forces

of sound, heat, and light were but the motions of matter, and that there was nothing substantial about them as phenomena-producing causes, would have been to abandon the entire Philosophy of Substantialism which, from the very start, we had mapped out as of universal application.

"To concede to science as at present taught the truth of the position that any force could be but the *motion* of material particles such as air or ether, would be to make force an *effect* and not a *cause*. Surely no one is so superficial, after his attention has been called distinctly to the subject, as not to see that the motion of matter, which is intrinsically inert, can only be the *effect* of some applied force which is its moving *cause*.

"To suppose force of any kind to be the motion of matter, and at the same time to be the cause of such motion, was to our mind an absurdity, though it glared at us from every page of our physical text-books; and it was no easy task to invent or discover a system of natural philosophy or scientific reasoning which would harmonise such inconsistency and thus bring order out of confusion. For plainly, as the motion-theories of science had presented the subject of force, the whole question seemed to us but a jumble of incoherent and self-contradictory statements.

"To assume force of every kind or character to be a *substantial cause*, and the motion of matter under all possible circumstances to be its *effect*, seemed at once the entering wedge for the solution of the whole mystery. But how was it possible to regard the physical forces as substantial entities or objective things, especially the force of sound which produces the sensation of hearing? This was the serious obstacle which met us at the very start. We saw but little difficulty in assuming magnetism and electricity, for example, to be substantial or objective things, since it was self-evident that the physical effects produced by these forms of natural force, such as the displacing and lifting of ponderable bodies, could by no possibility be accomplished except by some real substantial cause. To suppose otherwise, as we reasoned, would be at once to fly into the face of all philosophy and even of common sense.

"But at this point a concomitant difficulty struck us. If these forces are substantial, and at the same time penetrate, pervade, and occupy other bodies at the same time and without any displacement of their material particles, as is the case with magnetism, how about the supposed law of the impenetrability of matter, or the impossibility of the double occupancy of the same space by two material bodies at the same time?

Of course, this had to be met and reconciled with our new

departure, or good-bye to Substantialism. But the task of unlocking this scientific door was easy with the key already discovered and in our possession. Universal substance, we assumed in the very rationality of entitative existence, must involve *immaterial* as well as *material* substances. Hence the idea of that grand classification was for the first time sprung upon the world—namely, of making two departments of the existing entities of the universe by dividing them into material and immaterial substances—placing all tangible and ponderable objects in the first division, and all the forces of nature in the second.

"This fortunate thought, though somewhat difficult to grasp at first, soon brushed aside that whole difficulty involved in the idea of two actual substantial bodies occupying the same space at the same time, since now the most impervious steel can be wholly occupied, pervaded, and penetrated by the *substantial* forces of heat, magnetism, electricity, gravity, cohesion, and sound in every part and particle of the matter composing it, and at the same instant of time."

As I have already stated, Sound is, according to the teaching of the Substantial Philosophy, a force of nature—*that form of force by which the sense of hearing possessed by men and animals is addressed and affected.* Such is sound in its true and primary sense—an external and substantial force, or *objective cause;* but in common language it has a secondary meaning—namely, the *sensation* in our consciousness, which is more correctly called *hearing*—an internal sensation or *subjective effect.* Thus by a trope, which is designated metonymy, we have the *effect* put for the *cause.* It will be well to bear these facts always in view, and so avoid confusion of ideas. In all cases the true and infigurative signification should be intended in using the word sound, when one is discussing matters connected with music, or the science of acoustics.

Let me now briefly consider how far sound, according to the definition given, bears the test of reasonable and logical comparison with the other forces of nature, which immediately address and affect the animal consciousness. *Sound* is that force in nature having definite laws of production and propagation, which by entering our ears, or coming in contact by any other means with our auditory nerves, produces in our consciousness the sensation of *hearing*. *Light* is that force in nature having definite laws of production and propagation which, by entering our eyes and coming in contact with our optic nerves, produces in our consciousness the sensation of *seeing* or *sight*. *Heat* is that force in nature having its own laws, which, by affecting any portion of our system of tactile nerves, produces in our consciousness the sensation of *warmth*.

Odour is that force in nature which by entering our nostrils and coming in contact with our olfactory nerves, produces in our consciousness the sensation of *smelling* or *smell*. And *flavour* is that force which, coming in contact with our system of gustatory nerves, produces in our consciousness the sensation of *taste*.

It will at once be realised that in removing sound from its time-honoured place as a purely *mechanical effect* (for no logical reasoning on the part of the wave theorist can, under the mechanical or undulatory theory, place sound or sound-waves as a *cause*), and placing it in the dignified position amongst the primordial forces of nature, we reconcile it at once with all the other forces which more immediately address and affect our animal consciousness, as well as with those greater forces which we call cohesion, gravity, magnetism, and electricity. In such dignified position is it not infinitely more worthy of the musician's love and respect; and when viewed as a force direct from the hand of the Creator, does it not account for much which has hitherto been most mysterious in the power of music? Think of it, oh ye musicians!

I feel I have said very little on this great subject, and that little very badly; but I must now leave argument in words for argument in experimental demonstration. Time will, however, only permit of a few experiments, and that in the direction of showing you upon what very shallow arguments and wrong conclusions the wave theory of acoustics has been supported by its greatest advocates. As I pass on you will see how perfectly the theory of *substantial sound force* accounts for each and every phenomenon.

By way of an introduction to my first experimental demonstration of the nature of sound, let me direct your attention to the different teaching of the old and new theories of sound.

According to the wave theory we are taught that sound-waves, mechanically generated by the vibrating or exploding body, are capable of mechanically moving, shaking, or breaking other bodies against which they strike; whilst, according to the substantial force theory, we are assured that sound force, however great its volume may be, is absolutely incapable of moving a cobweb, or any body whatever which is not in vibrational sympathy with that sound force. Or, as Dr. Hall puts it: "The differences between theoretic air-waves, according to the current theory, and pulses of sound force according to Substantialism, is this: the air-waves are supposed to be purely mechanical in their operation, striking any and all objects in their way with the same force according to resisting surface. On the contrary, pulses of sound force are supposed to act on no material object that

is not in vibrational sympathy with them, any more than substantial rays of magnetism will act on a piece of wood or other body not in magnetic sympathy. There is no more necessity of assuming air-waves to be sent off from the vibrating instrument to beat against the tensioned string, diaphragm, or flame, to cause its motion, than there is of assuming that the magnetism which lifts the distant iron bar does it through some action exerted upon it by the connecting atmosphere. If the immaterial but substantial force of magnetism can produce physical displacement of a ponderable body at a distance, why cannot substantial but immaterial sound force do the same under a different law of nature?"

Now for our first experiment.

If you turn to the opening pages of the leading English text-book on acoustics, Professor Tyndall's "Sound," you will find, in the paragraphs devoted to the "Confinement of sound-waves in tubes," a very remarkable experiment described—the experiment I am now about to show you, just as Professor Tyndall performed it in the Royal Institution before a scientific audience, and then as I think it ought to be completed so as to get out its full teaching. Professor Tyndall thus clearly describes his remarkable experiment: "The weakening of sound, according to the law of inverse squares, would not take place if the *sound-wave* were so confined as to prevent its literal diffusion. By sending it through a tube with a smooth interior surface we accomplish this, and the wave thus confined may be transmitted to great distances with very little diminution of intensity. Into one end of a tin tube, fifteen feet long, I whisper in a manner quite inaudible to the people nearest to me, but a listener at the other end hears me distinctly. If a watch be placed at one end of the tube, a person at the other end hears the ticks, though nobody else does. At the distant end of the tube is now placed a lighted candle. When the hands are clapped at this end, the flame instantly ducks down at the other. It is not quite extinguished, but it is forcibly depressed. When two books are clapped together, the candle is blown out. You may," continues the Professor, "here observe, in a rough way, the speed with which the *sound-wave* is propagated. The instant the clap is heard the flame is extinguished. I do not say that the time required by the *sound* to travel through this tube is immeasurably short, but simply that the interval is too short for you to appreciate it. That it is a *pulse*, and not a *puff* of air, is proved by filling one end of the tube with the smoke of brown paper. On clapping the books together no trace of this smoke is ejected from the other end. The pulse," concludes the Professor, "has passed through both smoke and air without carrying either of them along with it."

Now, I have no wish to be disrespectful, but I cannot help asking the simple question—if any sane man can accept Professor Tyndall's experiment as a proof of the wave theory of sound, or believe his explanation of the whole matter?

I shall now perform the experiment before you exactly as Professor Tyndall performed it before his audience in the Royal Institution, in direct support of his favourite theory of sound; and then I shall conduct it as I think it ought to have been performed on that occasion, but was not, probably because its results would in no way have supported the wave theory.

Here is a tube similar in form to that used by Professor Tyndall, but much shorter. I prefer to use a short tube because the tests I subject the whole question to are very much more severe and conclusive with it than with a 15-foot tube. I place a lighted candle, with its flame immediately opposite the smaller orifice, and on clapping my hands at the other end the flame instantly "ducks down." Now, on clapping two books together the candle is blown out. Such were the results obtained by Prof. Tyndall; but is there a single person present on this occasion who believes for one instant that *sound* had anything whatever to do with either the disturbance or the extinction of the flame? Surely not. Yet Professor Tyndall assured those who witnessed the similar experiment in the Royal Institution that both effects were caused by a *sound-wave*—"a pulse, and not a puff of air." We cannot help thinking that the distinguished lecturer paid a very poor compliment to the common sense of his hearers, whilst he taxed their gullibility to the utmost. I need not waste time with the part of the original experiment which ended in smoke, but may pass on to my version of the experiment.

I relight the candle and place it, as before, opposite the small, conical end of the tube; and on the flame becoming perfectly still, I proceed to test the effect, not of simply disturbed air as in the previous case, but of powerful and true *sound force* upon it. I now take this horn, which is capable of yielding very loud and sudden sounds—much louder than any that can be produced by clapping books together—and placing its bell directly opposite the larger end of the tube, I produce several varieties of sounds, loud and soft, short and sustained, yet to none of these does the candle flame "duck down" or show the slighest disturbance. Here, notwithstanding that the air at the bell of the horn is necessarily disturbed by that blown into the instrument from my mouth, we have no sudden concussion, no puff of wind, as in Professor Tyndall's *sound-wave* version of the experiment, but simply *sound* pure and simple; and this *sound*, or *sound force*, passes through the short tube and through the

flame without finding anything in sympathy with it, and accordingly, without disturbing anything. Now what can the wave theorist say regarding Professor Tyndall's original experiment and my extension of it? Is it not self-evident that if the former supports the *wave theory* with its mechanically set up air-waves, the latter hopelessly refutes that theory? But even Professor Tyndall's experiment goes in no way to support his theory, simply because it was a sudden gust or puff of compressed wind which literally blew the candle out, and not sound of any kind. Anyone with a grain of common sense can see this, and it seems absurd insisting on the fact.

I have here a more perfect piece of apparatus, devised by myself, for the purpose of proving, in the first place, that vibrating sonorous bodies, while sending forth sound, do not disturb the air to any appreciable distance from their surfaces, and, in the second place, that the sound they send forth is incapable of moving or in any way affecting the lightest substances, or any substances or bodies whatever, which are not in perfect sympathy with the source of the sound.

The tuning-fork has been selected as the sound-producing body, because it is the favourite instrument in the hands of the acoustician for proving the existence of sound-waves, and for illustrating the mechanical action of those waves, as I shall show when I come to speak of sympathetic vibration and interference of sound. The remaining portion of the apparatus consists of a wooden tube, open at both ends, and furnished with small glass windows in the centre of its sides. Suspended within and between these windows is a strip of gold-leaf, almost filling up the air-way of the tube. The tube has a long slot cut in its lower side so that it can be moved over the prongs of the vibrating fork; or, what is more convenient, the fork can be moved, after being bowed, into the tube. Allowing the gold-leaf to hang perfectly still, I set the large fork into full vibration, and then push it into the tube until one of its prongs is quite close to the gold-leaf screen. If we are careful not to disturb the air we shall fail to observe the slightest flutter or movement of the leaf. Why is this? The wave theorist is bound to maintain that all the while sound-waves are being generated by the vibrating prong, and that they are sent off, with condensations and rarefactions, 4 feet 4 inches long, at the uniform rate of 256 in each second of time, and at the velocity of about 1,120 feet a second. The puzzle is how these waves—potent enough, in Professor Tyndall's estimation, to blow out a candle—manage to pass directly through the sensitive gold leaf screen without moving it. Here I might say, in the language of our greatest poet, "I pause for a reply."

As we are taught by the undulatory theory of acoustics that the sensation of hearing is caused by sound-waves or mechanically set up air-waves striking against the tympanic membranes of our ears and bending them in and out, it is highly desirable that we should, at this point, consider this important question connected with our sense of hearing, and strive to arrive at something like a true and logical conclusion anent the office and action of the ear.

The function of the ear is thus described by Professor A. M. Mayer, America's greatest wave theorist. He says: "Sound is the sensation peculiar to the ear. This sensation is caused by rapidly succeeding to-and-fro motions of the air which touches the outside surface of the drum-skin of the ear. These to-and-fro motions may be given to the air by a distant body, like a string of a violin." After briefly describing the structure of the ear, the Professor continues: "Let us consider how this wonderful little instrument acts when sonorous vibrations reach it. Imagine the violin string vibrating 500 times in one second. The sounding-board also makes 500 vibrations in a second. The air touching the violin is set trembling with 500 tremors a second, and these tremors speed with a velocity of 1,100 feet in a second in all directions through the surrounding air. They soon reach the drum-skin of the ear. The latter, being elastic, moves in and out with the air which touches it. Then this membrane, in its turn, pushes and pulls the little ear-bones 500 times in a second. The last bone, the little stirrup, finally receives the vibrations sent from the violin string, and sends them into the fluid of the inner ear, where they shake the fibres of the auditory nerve 500 times in a second. These tremors of the nerve—how we know not—so affect the brain that we have the sensation which we call sound." We are further assured by this eminent scientist that the description "just given is not that of a picture created by the imagination." We shall see!

I feel that it is somewhat rash on my part to enter on so complex a subject in this short Paper, for it would require at least a full Lecture to do it justice. It is, however, quite necessary that it should be touched upon on the present occasion for the better understanding of my arguments.

It is probable that the illustration given by Professor Mayer may not at first strike one as containing any element of impossibility or absurdity, and if the tympanic membrane was merely taxed to vibrate with one uniform motion, at one uniform rapidity, and to transmit only one sensation or impression to the auditory nerve and brain at one time, we might, perhaps, pause before boldly questioning the truth of the whole matter. But let us think for a moment of what the tympanic membrane is called upon to do in accordance

with the imperative demands on the wave theory of sound, and our reason at once starts up in open revolt at the mechanical impossibility it is asked to recognise as fact. Have you, musicians, in listening to a grand Symphony, performed by an orchestra of a hundred instrumentalists, tried, whilst you heard the united harmonies of all, and whilst you easily followed the sounds of each class of instrument engaged, to realise what your tympanic membranes were called upon to do according to the popular scientific hypothesis? If not, do so, and let your reason and common sense lead you to a true conclusion.

As I have given you the views of one great American scientist on tympanic vibration as caused by a single violin string vibrating 500 times in a second, let me now, in preference to any imperfect words of my own, give you the views of another American authority, Professor G. R. Hand, on the other aspect of tympanic vibration. "Substantialism is thundering at the gates of Popular Science, and demanding a re-examination of the facts and proofs of the undulatory theory of sound. Tympanic vibration opens the portals of her secret chambers and extends a cordial welcome to her auditorium. We enter for a few moments, and take hasty cognizance of the beauties and inconsistencies that press themselves upon our consideration, as the ear-drum labours with herculean efforts to convey intelligent sounds to the auditory nerve, according to the popular theory. Now hold your breath, and pause, and look, and listen, as you mentally interrogate Dame Nature at every point.

"You see the little drum-skin posted at the vestibule to introduce the visitors into the *sanctum sanctorum*. It is required to bend its flexibilities and complacently bow each visitor into the audience-room, though they come thick and fast as hail upon the unprotected window. Hark! The solemn notes from the lowest audible pitch of organ-pipe gravely demand admittance, and the muscular elasticity of our little sentinel is taxed to its minimum capacity to admit the troopers, with a genuflection or audiflection for each sound-pulse at the rate of not less than sixteen per second.

"Simultaneous with these, a troop more numerous, and more active and persistent, demand an audience, as notes of a higher pitch, borne upon miniature sound-pulses, demand an introduction. Our little sentinel is now compelled to fly around and bow say 440 times in a second, whilst these are entering. You say this requires activity! Yes, it does. But remember, that while bowing 440 times per second, he is at the same time bending at the rate of sixteen times per second. But this is not all. The sounds of a full orchestra strike upon the ear at the same time, and the notes of various pitch, running through several octaves, are distinctly, audibly heard

in beautiful harmony; but every note requires a different rate of vibration, and yet all at the same time, until perhaps a score of different rates of vibration are manipulated at the same time.

"Now we begin to feel a kind of melancholy sympathy for our little sentinel, who is compelled to practise upon possible impossibilities, in the vain attempt to stretch, and contract, and bend, and perform hundreds of gyrations per second, and at scores of different rates of velocity all at the same time. . . But the wave theory of sound compels submission to these absurdities and impossibilities, and while that bears sway our little sentinel must continue in this abject slavery.

"It is not out of order to question the right of assumption, or the authority of sending out these vocal and instrumental emanations in cavalry squadrons, mounted upon atmospheric waves or sound-pulses, to besiege our auricular organs in such a barbarous mode of attack. Almost any other member of the body would go to pieces or paralyze under the pressure of the unequal struggle against such an incessant and multitudinous bombardment.

"Thousands are assembled in a large hall. Hundreds of instruments of various kinds are playing in full orchestra. Thousands of voices are filling the air with all the notes within the compass of the human voice. We put on our philosophic glasses and see the sound-waves in endless variety emanating from these thousands of sonorous sources in all directions, from every centre, at different amplitudes and wave-lengths, meeting each other, crossing each other, at right angles, acute angles, obtuse angles, horizontally, vertically, and obliquely, impinging upon each other, dashing, surging, retreating, by impulse and reaction like a thousand wild animals turned loose in a menagerie, and yet amidst all this jarring and confusion each storm-tossed wave going with accuracy and unerring certainty, unchanged and pure, straight from its source to every point where an ear might be, and unloading its sonorous cargo all in good condition." The Professor concludes by saying: "If science desires to rejoice in unexceptional garments, she had better look to her wardrobe and repair these rents, or else replace her tattered duds with more reliable and scientific vestments."

Speaking of the musical sounds, the voices of men and women, the noises of rustling garments, gliding feet, clinking glasses, and so on, which fill a ball-room; and which "give rise to systems of waves, which dart through the mass of air in the room, are reflected from its walls, return, strike the opposite wall, are again reflected, and so on until they die out," Professor Helmholtz remarks: "And yet as the ear is able to distinguish all the separate constituent parts of this confused whole, we are forced to conclude that all these

different systems of wave co-exist in the mass of air, and leave one another mutually undisturbed. But how is it possible for them to co-exist, since every individual train of waves has at any particular point in the mass of air its own particular degree of condensation and rarefaction, which determines the velocity of the particles of air to this side or that? It is evident," says Helmholtz, without hesitation, "that at each point in the mass of air, at each instant of time, there can be only one single degree of condensation, and that the particles of air can be moving with only one single determinate kind of motion, having only one determinate amount of velocity, and passing in only one single determinate direction."

I may assure Professor Helmholtz that, on mechanical grounds alone, any other condition of things would be impossible, and we have only to imagine the point spoken of to be the tympanic membrane to see at one glance the absolute breakdown of the wave theory.

Professor Tyndall says: "The same air is competent to accept and transmit the vibrations of a thousand instruments at the same time. When we try to visualise the motion of that air—to present to the eye of the mind the battling of the pulses direct and reverberated—the imagination retires baffled from the attempt. Still, amid all the complexity, every particle of air is animated by a resultant motion, which is the algebraic sum of all the individual motions imparted to it. And the most wonderful thing of all is, that the human ear, though acted on only by a cylinder of that air, which does not exceed the thickness of a quill, can detect the components of that motion, and, by an act of attention, can even isolate from the aerial entanglement any particular sound." It is somewhat difficult to reconcile the teachings of these two eminent scientists, and I certainly have no time to attempt the task. A very few words must now suffice to dispose of the ear question.

It can be gathered from what I have just quoted and said, that to produce in our sensorium the sensation of hearing there must be external air-waves capable of setting up a mechanical action of a corresponding nature in the tympanic membrane of our ear. Under the wave theory, therefore, such air-waves must be capable of exerting some measurable force. On this subject I ask the wave theorist this first question: Can he measure the force of an air-wave sent off by the tuning-fork's prong whilst vibrating the $\frac{1}{17,000}$th of an inch at each full swing, or, say, the large distance of $\frac{1}{66}$th of an inch in a second of time? And, further, I ask him if he can honestly believe that the drum-skin of his ear, the chain of bones behind it, and, lastly, the entire apparatus of the inner ear, is made to vibrate in and out 256 times in a second

by the sound waves from a fork vibrating $\frac{256}{17.000}$ths of an inch in that time? Should he answer in the affirmative I can only recommend him to study mechanics.

From what has been said you will no doubt have been impressed with the more than marvellous delicacy and sensitiveness of the tympanic membrane of the human ear; for to do what the wave theory calls upon it to do—namely, to move to-and-fro in a hundred different degrees of velocity at the same instant of time, and, by so doing, to convey a hundred different sensations to the brain at the same instant of time—it needs must be endowed with more than marvellous delicacy and sensitiveness. But are you and the wave theorists prepared to learn that, instead of being a tightly stretched, fine, and exquisitely delicate skin or membrane, the so-called drum-skin of the ear is not a tensioned diaphragm at all, but a loose or flaccid mass of tissue, incapable of receiving or transmitting any sound-wave vibrations whatever, and that it has quite a different office to perform in the animal economy? Such, however, is affirmed to be the fact.

The drum-skin or tympanic membrane is essential to the very existence of the wave theory, for it is against its exterior surface the sound-waves, with their condensations and rarefactions, strike, and surge, and battle, so that a report of their good behaviour may be instantly conveyed to the brain. No wave theorist can afford to do without this membrane in the ear, for with its non-existence the wave theory would become a joke in science.

The next important question is this: Is the tympanic membrane necessary to our hearing? The following extract from the first volume of "Dunglison's Physiology," giving a report of a case examined by the celebrated Sir Astley Cooper, will be a sufficient and appropriate answer:—

"Sir Astley Cooper was consulted by a gentleman who had been attacked by an inflammation of his left ear, which continued for several weeks. After twelve months, the same symptoms occurred in the right ear; in consequence of these attacks he became deaf, and remained so for several months. The hearing began to return, and, in about ten months from the last attack he was restored to the state he was in when Sir Astley examined him. Having filled his mouth with air, he closed his nostrils and contracted his cheeks, the air thus compressed was heard to rush through the *meatus-auditorius* with a whistling noise, and the hair hanging from the temples became agitated by the current of air that issued from the ear; when a candle was applied the flame was agitated in a similar manner. Sir Astley passed a probe into *each* ear, and thought the membrane of the left side *totally* destroyed, as the probe struck against the petrous portion of the

temporal bone. The space usually occupied by the membrana tympani was found to be *an opening* or aperture without one trace remaining. On the other or right side also a probe could be passed into the cavity of the tympanum, through an opening one quarter of an inch in diameter in the centre of the tympanic membrane. Yet this gentleman was not only capable of hearing everything that was said in company, but was nicely susceptible of musical tones, he played the flute, and had frequently borne a part in concerts, and he sang with much taste and perfectly in tune."

Commenting on these facts, Dr. D. A. Post asks: "If the wave theory of sound is true, how could Sir Astley's patient hear so perfectly? Is not the *vibration* of the tympanic membrane as essential to that hypothesis as the *sonorous wave itself*? As both membranes in this case were undoubtedly destroyed will some *undulatory* gentleman account for the sensation of sound in this man?"

I shall leave the careful consideration of these questions to those amongst you who care to arrive at the truth in matters of sound, and need only sum up the conclusions I have come to after long study and thought, thus—The tympanic membrane has never been intended to vibrate or adapted for vibration by means of sound; it is, in fact, not a delicate stretched membrane at all; it is simply a flaccid mass of tendinous fibre designed to protect the sensitive inner organs of hearing from the injurious effects of sudden and very loud sounds, and from foreign matter which might find its way into the ear. In addition to this, it is probable that this screen, which is called the tympanic membrane, may be designed to distribute sound force and so render it more effective. We have no authority, however, for this last supposition, and, accordingly, lay no stress upon it.

It is quite evident that the truth of the wave theory depends upon the existence of a sensitive, vibrating drum-skin in the ear, for what comes of *air-waves* or *sound-waves*, with their condensations and rarefactions, if there is no such sensitive vibrating membrane? And what is to be said when we realise the fact that we can hear when both our drum-skins are destroyed? Let some wave theorist answer.

The wave theorist has still another rather remarkable fact to face and account for. It is well known that persons who are deaf to all sounds through their ears, can hear, to some considerable extent, through the bones of the head. In a lecture delivered by Sir William Thomson, at Birmingham, in 1883, we find this passage: "Hearing is perceiving something with the ear. What is it we perceive with the ear? *It is something we can also perceive without the ear;* something that the greatest master of sound, in the poetic and artistic sense of the word, at all events, that ever lived,

Beethoven, for a great part of his life could not perceive with his ear at all. He was deaf for a great part of his life, and during that period were composed some of his grandest musical compositions, and without the possibility of his hearing them by ear himself; for his hearing by ear was gone from him for ever. But he used to stand with a stick pressed against the piano and touching his teeth, and thus he could hear the sounds that he called forth from his instrument."

With all these facts before us, I think you will admit that the science of acoustics, as at present taught, calls loudly for reconsideration and much unprejudiced discussion. If it is true, its supporters need neither fear one nor the other, for the more truth is investigated the brighter it shines.

I must now touch, but very briefly, on the phenomenon of sound known as *sympathetic vibration*. If time permitted I should have been glad to have enlarged on this subject and to have performed some experiments with stretched strings, but, as matters stand, I must content myself with the single illustration of the sympathetic vibration of the tuning-forks.

Sympathetic vibration has always been held as a strong argument in favour of the existence of both air-waves and sound-waves, but I fail completely in discovering one connecting link between such vibration and mechanical sound-waves. The wave theory teaches that, in the case of the sympathetic forks, the sound-waves sent off by the fork which has been bowed or otherwise set into vibration pass through the air and, impinging on the motionless steel prongs of the other and, perhaps, distant fork, set them into corresponding vibration. The action is purely a mechanical one, for we are assured that the silent fork is set in motion by reiterated blows or pushes of the sound-waves. Such an idea is so contrary to reason and fact that I have to exercise some patience in speaking on the subject. You have already heard enough about the microscopic vibrations of the tuning-fork's prongs to satisfy your minds that no such mechanical action as air-waves, with condensations and rarefactions of the air, can possibly be set up by them; and my gold-leaf experiment has incontestibly proved that the vibrating fork does in no degree disturb even a confined column of air at the distance of one inch from its prongs. Under these circumstances, therefore, it is quite evident that sympathetic vibration must be due to some other force than these impotent and non-existent air or sound-waves, and this force is the *sound force* of the Substantial Theory of Acoustics as already explained. Now for just one experiment.

I have here two forks in perfect unison, and I shall be glad if any gentleman present will carry one to the extreme end of the room, and, holding it in his hand, satisfy himself that it is

absolutely silent. Let the fork be held so as to touch nothing and be free to vibrate. I now bow the remaining fork before you, and then I instantly damp it. My fork is silent; but that held in the hands of the gentleman at the far end of the room is now sounding quite audibly to his ears, and to yours also if you will hold the opening of the resonant case to your ears.

Will any wave theorist affirm that this effect has been produced by vibrations in the form of air-waves generated and sent off by the fork I bowed? Surely not! Look at the solid steel prongs of the fork, which weighs fifteen ounces—bear in mind the fact that the prongs of the bowed fork only moved about the $\frac{1}{20}$th of an inch in each complete swing at the most—and then look at the distance and the many obstructions between the two forks. Does it not now strike you that there is some hitherto unknown and unrealised *force* in *sound*—a *force* akin to the other forces of nature, such as electricity and magnetism? At all events, do not throw the idea aside as unworthy of your calm consideration and earnest investigation.

I am of opinion that sympathetic vibration or sympathetic generation of sound form one of the most remarkable and noteworthy phenomena of acoustics; and as there can be no question of the great importance of sympathetic vibration as a teacher and as a guide to a right understanding of the nature of sound, it is strange, to say the least of it, that so little stress is laid upon it in our text-books on the science of acoustics. For instance, in Professor Tyndall's "Sound," only about two and a half pages are devoted to the discussion of "sympathetic vibrations." I have observed in all text-books on acoustics that there is a studied avoidance of all matters that seem to favour any hypothesis rather than the accepted undulatory one, and I conclude, as wave theorists find themselves on rather shaky grounds in attempting to account for sympathetic vibration, they say as little on the subject as possible. How different is their treatment of what is called "interference of sound," a pet subject with all wave theorists, for the very existence of the wave theory depends upon its acceptance and full recognition as an established phenomenon of sound. Yet *sympathetic vibration* is a self-evident fact in nature, whilst the so-called "*interference of sound*" has never yet been satisfactorily demonstrated to exist. This I shall prove to you by some of the most notable experiments brought forward by wave theorists—experiments of the tin tube, books, and candle calibre—to prove the interference of, and, accordingly, the existence of, *sound-waves.*

Sympathetic vibration deserves to be much more carefully investigated than it has ever been; and, as I know from

experience, it presents a most fertile and interesting field for study. Enough is known to assure one that the investigation will reveal some very curious and astonishing results and effects.

Allow me now to show you an experiment which is not mentioned by Tyndall, Helmholtz, or Mayer, or in any work on acoustics known to me. The result of this experiment is, perhaps, one of the most wonderful in the entire range of sound force demonstration. I attribute the silence of the text-books regarding this experiment to two things—firstly, to the fact that it is little known; and, secondly, to the fact that it is almost a hopeless task to explain it on the wave theory, however ingeniously the argument may be framed.

The piece of apparatus I now submit for your inspection is called, for want of a better name, the "acoustical turbine," or, in the language of Dr. Kœnig, "*Roue de réaction acoustique*."

It consists of four small canister-shaped vessels of aluminum, closed except at their projecting necks. These vessels are resonators, accurately tuned to the note C^4, of 512 vibrations per second. The resonators are attached or suspended to the extremities of four arms, also of aluminum, provided at the crossing with a little agate cup, which rests upon a sharp steel point attached to a small stand. By this simple arrangement the suspended resonators are perfectly balanced and revolve with the greatest ease. The remaining part of the apparatus consists of a tuning-fork, C^4, perfectly in accord with the resonators, mounted on a resonant case.

The experiment is performed as follows: Placing the resonant case with its open end directly opposite the "turbine," which of course is perfectly motionless, I set the fork into vibration by bowing it at short intervals so as to keep up the discharge of sound force, and immediately the "turbine" commences to revolve and gradually gains speed until it moves round with considerable rapidity. The resonators move with their closed and flat ends foremost, carrying their open necks behind them, and they will move in no other way under the influence of sound force. If I set the turbine revolving in the opposite direction and then bow the fork, it will be observed that a diminution of speed instantly takes place, then the "turbine" comes to a stand-still, and then it slowly resumes its true motion. There is one important fact which must be mentioned—namely, that the apparatus will move with no fork which is not in perfect unison with the note to which the resonators have been tuned.

Attempts have been made to account for the action of this curious apparatus under the wave theory, but, to my mind, the reasons advanced are altogether insufficient, even if I believed in the existence of sound-waves. According to Drovák, who has written on the subject in *Poggendorff's Annalen*, the

revolution is caused by pressure within the resonators upon their closed ends. He argues that there is a node at the closed end of each resonator, and that the mean pressure of air in this node is superior to that of the air in repose. In the resonator the node is found at the bottom, and if the air in the resonator vibrates sufficiently to produce at the node, and, accordingly, close to the bottom, a mean pressure greater than the external air at repose, the reaction is there produced. This seems reasonable at first thoughts, but it will not stand careful analysis or investigation. Probably the ordinary wave theorist would claim that the revolution of the canisters is caused by the reiterated dashing of sound-waves or air-waves against them, just as he claims that the action of the sympathetic fork or of the tympanic membranes of our ears is caused by that same reiterated dashing. Should such air-waves and such mechanical dashing against the canisters exist, how comes it that the canisters revolve in the wrong direction? If we take a small card and quickly move it, so as to send off true air-waves, we find that, as the closed ends of the canisters present the largest surface to the action of the air, the turbine revolves in the opposite direction to that it takes under the influence of sound.

It is self-evident that in this interesting machine we see the effect of a mysterious cause—a wonderful illustration of sympathetic vibration, and evidence of the power of sound force which science has hitherto unacknowledged.

We are well acquainted with the marvellous powers of electric force, exerted upon objects at immense distances from its immediate or active source; and we know that a powerful magnet can stretch out its substantial but invisible hands, and pass them through solid obstructions, such as glass, wood, and metals which are not subject to magnetic influence, and lift or move ponderable bodies which are in sympathy with magnetic force, placed at considerable distances from its poles. But we are certainly not prepared to explain how the electric and magnetic forces do these wonderful things. So it is with natural sound force. We see in the sympathetic vibrations of tuning-forks and strings, and in the movement of the "acoustical turbine," evidences of a natural force operating in just as mysterious and subtle a manner as we observe electric and magnetic forces operating upon objects and substances in sympathy with them, and we cannot be expected, in the present state of scientific knowledge at least, to grasp the reason of one phenomenon more than another, whilst it may be in our power to satisfactorily prove how they are not accomplished.

Some time ago I submitted the problem of the revolution of the "acoustical turbine" to Dr. Hall for his consideration; and in his reply are the following remarks:—

"Let it be distinctly remembered that substantial but immaterial pulses of sound force do not act at all on material bodies, however light and easily moved, ***unless their vibrational tension puts them in synchronous sympathy with that of the sounding instrument.*** Hence, unless there were something connected with the four arms of this wheel having a tension in sympathetic synchronism with the substantial sound-pulses emitted by the C⁴ fork, it is manifest that such pulses would produce no effect on the wheel one way or the other. But here is the fact that unlocks the whole mystery. The air column or chamber in each of these resonators is in exact sympathy with the C⁴ fork, and has the same vibrational number; but as these air columns can only be reached in full power by the sympathetic force at the ends having the open necks, hence the substantial sound-pulses from the fork and its resonant case acting exclusively against that end of the air-chambers must necessarily drive the resonators in the direction which they do."

I leave this important subject of sympathetic vibration and movement with considerable reluctance, but it is imperative for me to move on to the consideration of the so-called *interference of sound*—a class of phenomena which has always been held in high favour by wave theorists as presenting unanswerable proofs of the existence of sound-waves, and accordingly of the truth of the wave theory.

You have all heard or read of this phenomenon of interference of sound, but have you all accepted the teaching of our acousticians on this matter as gospel? I hope not. I have both the assurance and the boldness to stand before you, the accomplished members of the most distinguished musical association in the land, and say that there is no such thing in existence as *interference of sound*, as taught in our text-books on acoustics. Before I proceed farther, let me ask you one question: Have you ever seriously realised in your minds what the musical effect of a full orchestra would be if there was such a thing as interference of sound, as taught by Professor Tyndall and the other great wave theorists?

Amongst the many misdirected and misrepresented experiments made by acousticians perhaps none are more amusing than those which have been brought forward with the view of proving the interference of sound. I shall briefly direct your attention to two or three of these experiments, and if they can be shown by anyone to clearly indicate the interference of sound-waves, and therefore the existence of sound-waves, I shall willingly abandon my opposition to the wave theory, and admit my error in advocating the theory which holds sound to be, like electricity, one of the primordial forces of nature.

Turning to the pages of the leading English text-book on

sound, we find these statements: "When two unisonant tuning-forks are sounded together it is easy to see that the forks may so vibrate that the condensations of one shall coincide with the condensations of the other, and the rarefactions of the one with the rarefactions of the other. If this be the case, the two forks will assist each other. It is, however, also easy to see that the two forks may be so related to each other that one of them shall require a condensation at the place where the other requires a rarefaction; that the one fork shall urge the air particles forward, while the other urges them backward. If the opposing forces be equal, particles so solicited will move neither backwards nor forwards, the aerial rest which corresponds to silence being the result. *Thus it is possible by adding the sound of one fork to that of another to abolish the sounds of both. We have here a phenomenon which, above all others, characterises wave-motion.*"

The same authority tells us how this *silence* is to be produced. He instructs us to place the two forks half a wave-length apart, and to set them in vibration, and he then asks—"What must occur? Manifestly the rarefactions of one system of waves will coincide with the condensations of the other system, the air (beyond the second fork) being reduced to quiescence. . . . The action here referred to is called *Interference*."

Now I unhesitatingly affirm that there is not one atom of truth in the statement made, and I defy any experimenter with two forks, or, indeed, with any two sounding bodies, to produce silence in the manner so clearly laid down. Here are two unison forks, made by the greatest manufacturer of acoustical apparatus who has ever lived, Dr. Kœnig, of Paris; let anyone produce silence with them, placed in any relative position, whilst they are both in vibration, and I shall acknowledge the law of interference. I cannot do it, and I say it cannot be done. So much for text-book teaching.

I have not by any means done with the teaching of this text-book. Turning to page 397 of the last edition of Professor Tyndall's "Sound," we find allusions to certain details connected with the "double siren" of Helmholtz. The most interesting are those relating to an experiment mentioned as proving the law of interference of sound. After pointing out that if the circle of twelve orifices is opened in each of the divisions of the instrument, directly opposite each other, "sounds flow together in perfect unison, the unison being maintained, however the pitch may be exalted"; the Professor informs us that this unison is disturbed by moving the upper wind chest, and then adds: "In the case before us, where the circle is perforated by twelve orifices, the rotation through $\frac{1}{24}$th of its circumference causes the

apertures of the upper wind chest to be closed at the precise moments when those of the lower one are opened, and *vice versâ*. It is plain, therefore, that the intervals between the puffs of the lower siren, which correspond to the rarefactions of the sonorous waves, are here filled by the puffs or condensations of the upper siren. *In fact, the condensations of the one coincide with the rarefactions of the other, and the absolute extinction of the sounds of both sirens is the consequence*."

The Professor continues—"I may seem to you to have exceeded the truth here, for when the handle is placed in the position which corresponds to *absolute extinction, you still hear a distinct sound*. . . . The reason is this: The sound of the siren is a highly composite one. By the suddenness and violence of its shocks, not only does it produce waves corresponding to the number of its orifices, but the ærial disturbance breaks up into secondary waves, which associate themselves with the primary waves of the instrument, exactly as the harmonics of a string, or of an open organ pipe, mix with their fundamental tone. When the siren sounds, therefore, it emits, besides the fundamental tone, its octave, its twelfth, its double octave, and so on. . . Now, by turning the upper siren through $\frac{1}{24}$th of its circumference, we extinguish utterly the fundamental tone. But we do not extinguish its octave. Hence, when the handle is in the position which corresponds to the extinction of the fundamental tone, instead of silence, we have the full first harmonic of the instrument."

I cannot pause to comment fully upon the passages quoted, which, however, may be said to present about the loosest piece of scientific reasoning to be found in our text-books. We are first told that "the absolute extinction of the sounds of both sirens" takes place; then we are informed that we "still hear a distinct sound." Further we are told that the fundamental tone is "extinguished utterly," whilst we hear its "full first harmonic." Just imagine the existence of a "full first harmonic" of a fundamental tone where there is no fundamental tone!

Now the phenomenon, if it may be called one, which is observed when the two portions of the siren are so placed as to bring the puffs of one exactly between the puffs of the other has nothing whatever to do with interference of sound, and this fact must be self-evident to the youngest student of acoustics. The true explanation is this. When the circles of twelve orifices are exactly opposite each other, the puffs from both occur together, and a musical sound is produced equal in pitch to that yielded by a single revolving disc of twelve orifices, moving at the same velocity. Suppose the two discs revolve together twenty-two times in a second,

the note produced would be C^3 of 264 vibrations. If we now turn the upper portion, or wind chest, of the siren $\frac{1}{24}$th of its circumference, so as to bring Professor Tyndall's *interference* into operation, we certainly no longer hear C^3 of 264 vibrations, but, as a simple matter of course, C^4 of 528 vibrations. The combined discs of the single instrument, fed by the same air tube, now yield, instead of twelve double puffs to each revolution, twenty-four single puffs to each revolution. The mystery is solved, but where is the *interference of sound* and the consequent proof of the existence of sound-waves? In case my brief explanation might not be perfectly clear to you all, I have prepared a diagram of the two siren discs, which will make my meaning evident at a glance.

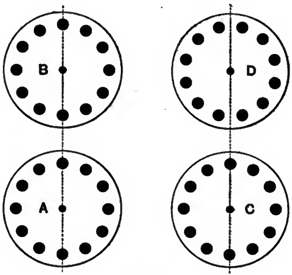


Fig. 2.

In Fig. 2, two pairs of discs are shown. The two discs A and B are in the relative position which places the circles of twelve orifices exactly opposite each other (as indicated by the dotted line), when the puffs from both occur together, producing, say, the note C^3 of 264 vibrations. The two discs C and D are in the relative position which places one series of twelve holes exactly between the other series of twelve holes, thus yielding 24 puffs at each revolution, and,

accordingly, producing the note C^4 of 528 vibrations. The dotted line shows the altered relation of the discs C and D.

Turning now to the section of Professor Tyndall's book devoted to the "Interference of Waves from a Vibrating Disc," we find a most interesting experiment treated in a rather curious and one-sided manner. The writer remarks: "We are now prepared for a very instructive experiment, which we owe to M. Lissajous. Drawing a bow over the edge of a brass disc, I divide it into six vibrating sectors. When the palm of the hand is brought over any one of them, the sound, instead of being diminished, is augmented. When two hands are placed over two adjacent sectors, you notice no increase of the sound; but when they are placed over alternate sectors, a striking augmentation of the sound is the consequence. By simply lowering and raising the hands, marked variations of intensity are produced. By the approach of the hands the vibrations of the two sectors are intercepted; their interference right and left being thus abolished, the remaining sectors sound more loudly. Passing the single hand to and fro over the surface, you also hear a rise and fall of the sound. It rises when the hand is over a vibrating sector, it falls when the hand is over a nodal line. Thus by sacrificing a portion of the vibrations we make the residue more effectual."

We have here an experiment performed in a decidedly one-sided manner, and an argument which badly wants a little of the light of common sense let in upon it. Before I proceed to my experimental demonstrations, let me assure you that interference of sound, as understood by the wave theorist, has nothing to do with the phenomena of the vibrating disc or plate just described, but that we have to credit *resonance* for all the increase of sound observed.

Throughout this notable experiment of the Professor's it must be realised that he supposed the ear to be placed *above* the level of the brass plate, and quite overlooked two very important things—in the first place, that the plate had two sides equally capable of producing condensations and rarefactions; and, in the second place, he quite forgot to test what result would follow to the ear placed over the plate when the hands were applied to the underside of the plate. Now this latter matter was certainly a very grave oversight on the part of so skilful an experimenter, as I shall proceed to show.

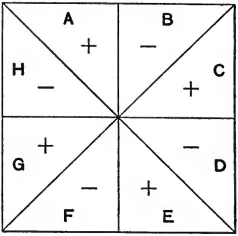


Fig. 3.

I have here a square plate of brass, specially made for this experiment by Dr. Kœnig, and I earnestly ask your close attention to the sounds it will produce, for I am afraid they will not carry far with any degree of clearness. I have also brought a diagram showing one way in which the plate divides itself into vibrating sections and nodal lines when bowed. I shall now divide the plate into the eight sections as shown on diagram Fig 3, as that is the nearest to the division mentioned by Professor Tyndall, and answers perfectly to illustrate the absurdity of the interference hypothesis. I sprinkle sand over the plate and bow its edge. The sand has arranged itself like the lines on the diagram and you hear the sound it is sending forth from each equal section, now in rapid vibration.

Observe the following effects. As the hand is a clumsy article in so delicate an experiment I have made wooden and cardboard covers to suit all the divisions of the plate. Taking one of the wooden covers I bring it down over only one of the divisions, say, A, and immediately you hear an augmentation of the sound, and as I raise and lower it you hear the sound falling and swelling out. Now leaving the *top* of the plate with its *condensations* and *rarefactions* to take care of itself, I apply the board to the same division on the *underside* of the plate, and you observe that the effect is precisely the same.

You will remember that Professor Tyndall states that "when two hands are placed over two adjacent sectors you notice no increase of the sound." Just let me test this. The plate is now sounding, and I cover two adjacent sectors, say, A and B or B and C, or any two in any part of the plate,

with the result of a marked augmentation of the sound in each and every case. I do the same underneath the plate with exactly the same result. In fact, it is impossible to cover any two sectors, above or below, without an augmentation of sound.

I now cover any half of the plate—namely, H, A, B, C, or A, B, C, D, and still the sound is increased, and finally I cover the entire square with a similar result.

From these facts it must be obvious to any person with any reasoning powers that the idea of *interference* is a myth, and that the cause of the augmentation of the sound is the *resonance of the air column contained between the board and the surface of the sonorous plate.*

Time will not permit my going into the consideration of the other experiments in support of the so-called interference of sound, and I need only say that every one which has come under my observation is capable of being just as easily accounted for and refuted as those I have alluded to and tested.

In conclusion, I must assure you that many weighty arguments against the truth of the wave theory, and, accordingly, in support of the substantial theory, remain untouched. Chief amongst these is what is known as the "Locust argument." An hour's talking would hardly exhaust this fertile subject, so, with just a suggestion of its nature, I shall leave it for future consideration. "There is a well-known insect," says Professor Henry Mott, "one of the *locustidæ* (a saltatorial family of the order *orthoptera*), whose stridulations can be heard a distance of more than a mile, as attested to by Darwin and others. This insect weighs less than a quarter of a pennyweight, and can, by simply rasping its legs across the nervures of its wings (for this is the way its tone is produced), according to the wave theory, create a physical agitation and displacement of the air which converts four cubic miles of atmosphere into waves consisting of condensations and rarefactions, the compressed portions of which contain a sufficient augmentation of heat above the normal heat of the atmosphere to add one-sixth to the elasticity of the air and the velocity of sound." I am much tempted to go into some of the very astonishing calculations which have been based on the energy of the locust in strict accordance with the demands of the wave theory, but must refrain and close this paper, which is already much too long.

Commending the entire subject to your dispassionate and attentive consideration, and thanking you for your courteous and patient attention, I conclude.

DISCUSSION.

THE CHAIRMAN.—Ladies and gentlemen, this subject is likely to provoke a considerable amount of discussion; but we must first tender our hearty thanks to Mr. Audsley for the very interesting paper he has presented to us on this occasion. There is very little for me to say on the subject, because, of course, it is a special branch into which the practical musician does not always enter. He should, however, be scientific as well as pleasing to his listeners, and I hope, therefore, that musicians will thoroughly appreciate the importance of going into this branch of the study. I will call on Mr. Sedley Taylor to open the discussion.

MR. SEDLEY TAYLOR.—I feel that the subject is a very extensive one; we have had a great many interesting points raised which it would be utterly impossible for me to touch upon *seriatim;* to do so would exhaust all the remaining time, and prevent your hearing anybody else. I think, therefore, the best thing I can do is to pass very briefly over the notes I have made, and refer to but a few of the leading considerations which appear important with regard to the alternative between two theories which has been laid before us. In passing, I may say that the reader of the paper placed the beginning of the undulatory theory at too early a period of antiquity, for I understood him to say it was for some 2,000 years that this theory had held possession of the field; but, according to my recollections of the history of science, it is a comparatively modern thing. I do not think that before the time of Newton—and certainly not before that of Galileo—there was any definite idea of the propagation of sound according to the wave theory; in any case, that theory has not been in existence for anything like 2,000 years. I should like to say that in the progress of an exact science like acoustics, acceptance of a theory on mere authority has no place at all; yet the matter has been represented by the reader of the paper as if acousticians had blindly, like so many sheep, accepted the dicta of particular philosophers; I do not think that corresponds with fact at all. The best man wins, and the best theory wins. No doubt mere popular expositors of a theory often adopt without examination what is put before them by a discoverer, but those who have made the history of this subject what it is have secured each step at the point of the bayonet; they have had to fight for each step made, and I can therefore see no justification for saying with Mr. Audsley that there is a total want of common sense in a man like Newton or Galileo. However, the question before us now is whether the wave

theory is false or not. Great stress has been laid by Mr. Audsley on the writings of Professor Tyndall on this subject, and he has assumed somewhat too hastily that whatever Tyndall states necessarily represents with undeniable accuracy the facts of acoustical theory. Now, as I some time ago, in the pages of *Nature*, pointed out that in the first two editions of Professor Tyndall's book on sound there was a mistake which vitiated an entire chapter and showed that he had radically misunderstood Helmholtz's theory of consonance and dissonance, I cannot be expected to defend everything Tyndall has written. Whether his experiment with the candle was futile, as Mr. Audsley contended, must depend on whether the scope of the experiment as made by Tyndall coincides with that of its reproduction here. In any case, however, if Tyndall, who is no doubt an eminent popular exponent of this science, but not a theoretical authority in it, has made a mistake, that supplies no presumption against the wave theory of sound. Mr. Audsley complains that wave theorists talk about sound as being something in the air and also something in the human ear, and so confuse these two things together; but I think he practically claimed for his own theory exactly the same privilege, sometimes speaking of sound in the air and sometimes of sound in the ear. A real distinction unquestionably exists between these two senses of the same word. By sound in the air we mean vibrations, by sound in the ear we mean a sensation. But the distinction is so obvious that no confusion need arise between these two senses in which the same word is used. When we talk, for instance, of sound travelling through the air, we mean the propagation through it of particular mechanical vibrations, and any other phraseology would be cumbrous and pedantic, since it would supply no corresponding increase of clearness. Passing from preliminary matters, I come now to the "substantial" theory itself. I confess that I failed to gather from the definition given in the paper what is the precise nature of that theory. Perhaps Mr. Audsley would kindly read over again the sentences in which he defined the substantial theory. The undulatory theory may, of course, be erroneous; but it is at least based on precise and clearly intelligible conceptions, which I am as yet unable to see is the case with the theory which Mr. Audsley seeks to put in its place.

Mr. AUDSLEY.—Perhaps I may explain without reading. The new theory claims that sound is simply a force of nature, precisely as electricity and magnetism are forces of nature.

Mr. JACQUES.—How would you define a force?

Mr. AUDSLEY.—It may be simply defined as that element in nature which *does* something. You know what a magnet can do; it can lift a piece of iron—therefore it is quite obvious

that magnetism is a force capable of doing something when it thus moves inert matter.

Mr. JACQUES.—Do you think that exists apart from the matter of the magnet? Has any force an existence apart from matter?

Mr. AUDSLEY.—Force exhibits itself through the agency of matter.

Mr. JACQUES.—Therefore there must be matter exerting force.

Mr. AUDSLEY.—Matter must be present for the exhibition of force.

Mr. JACQUES.—If I understand you, in one part of your paper you were rather throwing ridicule on the notion that force could be a result.

Mr. AUDSLEY.—Force cannot be a *result* or an *effect*, as it is in all cases in nature a *phenomena-producing cause.*

Mr. JACQUES.—On the other hand, if it emanates from matter—

Mr. AUDSLEY.—It cannot exhibit itself without matter.

Mr. JACQUES.—Then matter must be in existence before the force exhibits itself.

Mr. SEDLEY TAYLOR.—The point I was anxious to make out was the precise sense in which the words "substantial" and "immaterial" were used. We were told the force was a substantial force, and that it was also an immaterial force. I noted down the words "substantial entity" and "objective existence," but these expressions employed to describe a force convey no definite idea to my mind.

Mr. AUDSLEY.—A great number of eminent scientists have experienced a great difficulty in realising what is exactly meant. The clause that you want me to read is this: "Sound is one of the primordial forces of nature; it is a substantial force or an immaterial objective entity, governed by laws ordained and fixed immutably by the Great Architect of the Universe."

Mr. SEDLEY TAYLOR.—The words "immaterial objective entity" do not seem to me to convey a definite idea.

Mr. AUDSLEY.—Then I gave the founder's definition of that so that there should be no mistake about it. [Mr. Audsley here quoted a passage from the paper (p. 114), beginning "To concede to science," &c., to the words "moving cause."]

Mr. SEDLEY TAYLOR.—I will then merely venture to say that I am not a metaphysician, and that these words convey nothing on which my mind is able to take hold. In asserting, as is done in the paper, that a body in motion must necessarily be acted upon by a force, Mr. Audsley goes right in the teeth of the "first law of motion" established by Galileo, and on which Newton based the theory of universal

gravitation. That law lays down that the mere fact of a body being in motion does not show that it is under the action of any force; nay, that if the body be moving in a straight line, and with uniform velocity, that is conclusive evidence that the body is acted on by no force, or by a system of forces which neutralize each other's action so that their resultant force on the body is zero. Galileo and Newton may, of course, be wrong in this matter, and Mr. Audsley and his friends right, but this is certainly not self-evident; it will have to be proved if it is to be accepted. Mr. Audsley has very confidently asserted that sound transmitted through the air is incapable of setting matter in vibration, except in cases of "resonance" or "sympathy." Now with regard to the experiment which was shown us with the gold leaf, I do not believe myself that if ten times as loud a sound had been made, the gold leaf would have been moved. I quite agree to that; but I can produce an experiment of a more delicate kind, which I contend is practically decisive of the issue. I understood Mr. Audsley to say that the yes or no of the whole question between the "wave" and "substantial" theories of sound depended on whether a tuning-fork can or cannot set a neighbouring material object, with which it is not in contact, into vibration, apart from the special case of sympathy. Now, although the gold leaf was not delicate enough to show vibration, if you take a film of fluid sufficiently thin, you will find that a tuning-fork can transmit to it a visibly recognisable state of vibration. Spread a soap film over a small horizontal aperture, wait until the colours show themselves, and then bring a prong of a smartly struck tuning-fork close to the film. The changed arrangement of the colours which will instantly result will show that the film is agitated by the action of the fork's prong. This experiment seems to me to dispose of any theory involving the assertion that a sounding body is incapable of communicating through the air vibratory motion to any other body except in the single isolated case of sympathy, of which the experiment adduced by me is wholly independent. I should like to ask Mr. Audsley how it comes to pass that this "substantial" force is obliterated when the air disappears. We all know the ordinary experiment of ringing a bell under the receiver of an air-pump. When the receiver is exhausted, so that there is no air left in it, the sound ceases, although, by means of an electric communication, the clapper be kept striking the bell. The cessation of the sound at once explains itself on the undulatory theory, because the particles which are wanted to carry the sound from the bell are taken away by the exhaustion; but it would seem that an "immaterial" force ought to pass through a vacuum as readily as through matter in any of its forms, gaseous, liquid,

or solid. I should like to know how the advocates of the substantial theory deal with this point. Mr. Audsley pronounces the phenomenon, described in the writings of acousticians by the term "interference," to be totally non-existent. In reply to that I would refer to the well-known experiment in which sound from one prong of a tuning-fork is conducted through two tubes of unequal lengths which finally open into a common orifice. When the relative lengths of the tubes are adjusted in a particular manner, all but complete silence prevails at their common orifice. This experiment is described in Tyndall's book; I have tried it over and over again with success, and, in my judgment, it completely establishes the reality of the phenomenon of interference which Mr. Audsley asserts to be non-existent. The only point raised in the paper which seems to me to constitute any real difficulty in respect to the wave theory is the extreme slowness with which the prongs of a tuning-fork must move when emitting the faintest audible sounds. I do not doubt, however, that this difficulty, such as it is, will yield when it is taken in hand by an investigator possessing such command of the higher branches of mathematics as is essential for original dealing with most acoustical problems of any difficulty. On the whole, then, I am far from thinking that the arguments advanced in the paper and the experiments made before us have demolished the wave theory of sound, and it appears to me that the alternative theory, as it has been here presented to us, is little more than the very vague statement that sound is a primordial force. We are not told what are the laws of that primordial force, and, in the absence of such information, there seems to be no basis from which to start in working out a scientific theory and applying it to the exact calculation of acoustical phenomena.

Mr. A. J. Ellis.—So much allusion has been made by the lecturer to Professor Helmholtz, whose work I had the honour of translating, that I feel I ought to make some observations upon the subject. I will start with the interference of sound. With regard to that, I think if you take an ordinary tuning fork, and sound it, and then turn it in your fingers before your ear you will hear the sound disappear and re-appear. If that is not interference, what is it? It is one of the simplest and commonest experiments that are made. With regard to Helmholtz's double syren, I do not see how Mr. Audsley established that, because the primary tone was destroyed, therefore you heard the double tone; that is to say, that the condensation and rarefication answered to one another and produced the octave or the double vibration. I do not see how that was proved at all. Then again with regard to the statement that has been made that sound was a

primordial force of nature. Without having any hypothesis to calculate upon from that, I do not see that that explains anything whatever. It is true that we may say electricity is one of the primordial forces of nature, but though we do not know the least in the world what it is, we know what it does, and we have plenty of theories which can be worked out from it mathematically. When Mr. Audsley has furnished some theories which you can work out mathematically with regard to this sound force, then I think it will command attention from mathematicians and physicists generally, but at present I do not see that we have anything to discuss. He says there are certain points of difficulty, and the acoustic turbine was a point of difficulty; but he had already quoted some explanation which was given in Poggendorff's Annals. I do not know the experiment sufficiently to be able to speak about it farther than that, but I do not think that he proved that sound is a primordial force of nature which was immaterial, and yet moved a material substance. There is that great difficulty in it. However, this is a subject that cannot be discussed in five or ten minutes at the end of an hour and three quarters' lecture. It has to be laid down in books with a number of experiments suggested and carried out, and if there is anything that it proves which the wave theory does not prove then physicists will have to consider it with very great care, but at present I do not see that they are called upon to do so.

Mr. Blaikley.—Mr. Sedley Taylor and Mr. Ellis have touched upon the points that struck me most forcibly in what we have heard, but I may add one word with respect to Professor Tyndall's work on Sound. I have always read it and understood it (and I heard the original lectures) as an epitome for comparatively popular reading, as it were, of Helmholtz's work, and not as embodying any very deep researches of Professor Tyndall's own, or as constituting a work on the theory of acoustics in precise scientific language. With respect to that experiment of the pulse of air driven through a tube, no doubt in many cases some actual wind travels through, but as I understand the experiment recorded by Professor Tyndall he gives it as an illustration merely of the fact that it is not necessary that the body of air should travel through a tube. He gives it as an instance of the nature of a pulsation, which he illustrates by putting smoke at one end of the tube, none of which smoke appears at the other end where the candle is blown out. With respect to the point made with regard to the actual motion of the prong of the tuning fork and the rapidity of the motion, I never read the statements either in Helmholtz's work or in Tyndall's as conveying the meaning they have according to Mr. Audsley. I understood these writers when the

question of rapidity was entered upon to refer to the rapidity of the vibration and not the rapidity of the motion in feet or inches per second, which is, of course, a totally different thing. I understand rapidity as greatness of frequency. Then when we consider the question of the amount of amplitude of the tuning fork's vibration, I cannot understand the point that is made of it. No doubt it is very marvellous if we consider that a beetle's legs or wings can affect many tons of air and set them in vibration, but it appears to me one sees other things in nature equally marvellous, and I do not feel at all convinced yet that there is much force in what we have heard on this point. With regard to the reception of sound or perception of sound by the ear, why should it be more wonderful or inexplicable that the ear can receive a multiplicity of waves of different forms, periods, and so forth, constituting different tones, than that the retina of the eye can receive an innumerable number of waves, giving innumerable co-existent impressions of different colours and different forms? If it is inexplicable in the case of the one organ it is equally so in the case of the other, I think. The question of sound in a vacuum has been touched upon. With respect to the experiment of the tuning fork and the gold leaf there is this question to be considered, that we cannot conceive of a tuning fork sending out puffs of wind in one direction without remembering that there is a return of the air immediately after, hundreds of times in a second, according to the period of the fork, and therefore the eye could not detect the to-and-fro motion of the slip of gold leaf at that rate. It would not be in one direction only, as if wind were propelled out from the tuning fork without returning. The gradual change from visible pendular motion to invisible pendular motion causing sound is illustrated by the common experiment of a slip of wood fixed in a vice, and gradually shortened down, through which shortening that which was visible motion becomes faster until it is recognised only as sound by the ear. The point suggested by that experiment I should like to have heard more touched upon in the paper. There is another common acoustical experiment: the gradual change from a condition of things the eye can appreciate to that which can be appreciated only by the ear, as in the vibration of a heavy contra-bass string. A few years ago, through the kindness of Mr. Stroh, I had the opportunity of producing records of wave forms found in air by means of his apparatus. The bells of horns, such as the one used this afternoon by Mr. Audsley, and other instruments were held near the registering membrane while notes were being sounded, with very beautiful results. The pen recorded many varieties of wave forms, which could have been received only from the air.

If such aerial wave forms can thus affect a mechanical apparatus, why cannot they affect the ear in the same way?

Mr. Webb.—If the wave theory is not true, how is it that an organ pipe is doubled in tone by stopping the end of it? As for the vibrations of the tuning fork being transmitted, you can test that out very easily by putting it to the end of your teeth, when you will at once find exquisite pain occasioned.

Mr. Jacques.—Does not the fact that puffs through the holes in a revolving card produce a musical sound tell against Mr. Audsley's view? Surely he cannot be unaware of that fact, and I wish he had mentioned it in the course of his lecture. No doubt he will be able to give some explanation as to the puffs of air becoming sound merely when they become rapid.

Mr. Audsley.—I now realise exactly the same difficulty that I realised when writing the paper. I had to leave so much unsaid, although my paper occupied 103 pages of MS., that I found the ground I had left untrodden was about ten times as much as that I had covered; and the important points these gentlemen have discussed are the points I am perfectly prepared to treat in another lecture at a future time. To enter into them at the present time would only weary you, and after so long a paper would be out of place. If the Society feels the slightest inclination to follow up this matter I shall be very glad indeed to take up many of these points in another paper. In the first place, with regard to Mr. Sedley Taylor's remarks as to the vibration of a film of fluid, I understand that that film is suspended over an air chamber.

Mr. Sedley Taylor.—No, over an aperture.

Mr. Audsley.—There is an air chamber underneath the film, so I should presume it is another question of resonance.

Mr. Sedley Taylor.—No, it does not matter what pitch the fork is.

Mr. Audsley.—Still there is this peculiarity of air, that sounding bodies have the power of making resonance chambers, so to speak, in it to suit themselves, otherwise we should find it an extremely difficult matter to deal with sound in our every-day life. Air is one of the finest resonators in existence, as is shown by an organ pipe or any other resonance chamber. Take a fork that you can hardly hear sound at all, place it opposite a chamber that is full of air, and you will immediately find that sound is given forth very readily, the more readily in proportion as the contained volume of air gets nearer to perfect sympathy with the fork. Now the fork cannot produce any more mechanical effect when held before an enclosed air column than it can in the open air, but it will give a sound one hundred times as loud as it produces in the open air. Air accordingly gets

very readily into vibration, and liberates sound or pulses of sound force. With regard to the film, although I have never experimented with it, I should imagine, considering the matter hastily on the basis of other and somewhat similar experiments, that it is the air that is in the immediate neighbourhood under or over the film that is affecting the film *in portions* with sound pulses. When the film happens to be in perfect sympathy with the sound force, it directly responds as *a whole*. You must take that as my explanation on the spur of the moment. You have had an opportunity of performing such experiments, but I have not experimented with these films. I am quite convinced that the effects are not caused by air waves, but by sound force affecting the air in sympathy with it in the immediate neighbourhood of the film, or probably in sympathy with the film itself. Now there is no object in Nature too light to be affected by sound force in sympathy with it. I am not bound to explain what sound is any more than I am bound to explain what magnetism is; but if I may say that magnetism is a natural force I say sound also is a natural force. I grant this has to be proved. As to the conduction of sound in air, it must be realised that sound requires a conducting medium precisely as in the case of electricity or magnetism. Air is one of the great natural conductors of sound, and when you remove the air you remove the means of conduction. From the very fact of sound being a natural force it has certain laws controlling it, and two of the grand laws are that sound shall be generated by the molecular vibration of a sonorous body, and that it shall be conducted by some medium. Those are the two conditions you start with; remove the air and you immediately remove the power of the sound force being conducted. We know it is conducted in wood about fifteen times faster than in air, and the wave theorists certainly cannot tell me why; when one scratches one end of a long balk of timber with a pin the sound of the scratch is heard distinctly by an ear pressed against the other end, whilst it could not be heard through air at the distance of a few inches. Wood in this case is the better conductor. A watch laid on a balk of timber will sound to the ear pressed against the other end almost as loud, in fact, much louder than to the ear held close to the watch in the open air. Will the wave theorists say that the whole of that balk of timber, many yards long, is put into vibration so many hundred times a second by the ticking of the watch? I do not think we are prepared to believe that the tick of the watch can possibly send off sound waves to go through a balk of timber, say, twenty yards long, in the fraction of a second, according to the pitch of the sounds of the watch. However, these are things that I have not touched upon on the present occasion, but which

I should be glad to discuss more fully. I was bound to leave the question of the conduction of sound entirely out of my paper. With regard to the "interference of sound," I contend that is simply a question of perfect or imperfect resonance. I think sympathetic vibration and resonance are two of the great phenomena we have to study with regard to sound, and neither of them has been studied sufficiently. I hold that those two classes of phenomena point more clearly to what sound really is than any other. Now as to the vibration of the prongs of a fork—I have a book by Professor Mott, of America, who is also a distinguished member of one of our London societies, an engineer of considerable renown, and a chemist of very great parts; but I should be afraid to show you the list of calculations he has made upon vibrations of tuning-forks; I think they go to eleven figures, but I have stopped at seven figures. The tuning-fork Mr. Ellis referred to, held on the angle, is another matter I would not only have introduced, but would have experimented with to-day, but it was impossible to do everything, and I would rather you would allow me to leave it to my next lecture. It is one of the proofs of the new theory of sound. With regard to the double syren producing the octave, I think Mr. Ellis misunderstood me. I did not accuse Professor Helmholtz of making a mistake; I accused Professor Tyndall of using the double syren and making a mistake with it. Tyndall says, when the holes of the upper and lower wind-chests are open, so that you get twelve double puffs, that is, twelve from above and twelve from below at each revolution, you have then the fundamental tone; you have, as I say, if the disc is revolving twenty-two times in a second, C, with 264 vibrations, that is, twenty-two multiplied by twelve. Now so long as the syren remains with the discs in this position, you will only get a powerful sound of that pitch while the wheel is revolving twenty-two times a second; but now change the phase—change the disc so that you have the puffs from the upper syren coming between the puffs of the lower syren; you have now twenty-four puffs at each revolution of the disc, hence you get the octave above. The mistake that Tyndall makes is in saying that the fundamental tone is destroyed through *interference*, and the note you hear is the "first harmonic." How can you hear the harmonic when there is no fundamental tone? With regard to Tyndall's being simply a popular book, if it must be looked upon in that light only and not as a correct exposition of the science of acoustics as at present taught, the sooner it is done away with the better, and let us have a proper one in its place. At present we have no book we can apply to as an exponent of the ordinary facts of acoustics that every student is supposed to master and to accept.

Much of the book is correct, of course—that which simply tells us of the phenomena of sound I do not dispute. In many cases the results of experiments are the same, but the conclusions deduced from them are distinctly different. I showed you by the Chladni plate experiment that instead of the facts being as he represents them they are entirely opposite, and it is a pity that the theory, if it is a sound one, should be connected with such unsatisfactory experiments. I agree most decidedly with Professor Huxley that if one hypothesis can be proved false the whole must go. With regard to the movements of the fork being frequent, I think my reading is the right one in this way. You are told that a pendulum cannot create sound because it is not fast enough.

Mr. BLAIKLEY.—Its frequency is not fast enough.

Mr. AUDSLEY.—You can reduce that by calculation. The frequency cannot amount to anything when the aggregate is only the small fraction of an inch in a minute, because you see it must start sound waves 4 ft. 4 in. long by blows of the prongs only swinging the one four-millionth of an inch.

Mr. BLAIKLEY.—I do not see the mathematical impossibility.

Mr. AUDSLEY.—It has been fairly well proved, I think, but a question will always remain; one will say it is impossible, and the other will not realise the impossibility of it. As to the ear and the eye receiving sound and light, they are both equally wonderful. Light is a *force of nature* and not a *mechanical motion*, and sound also is a *force of nature* and not a *mechanical pulsation*. We know what light has passed through, and we do not know that we have quite arrived at what light really is. Newton's theory was exploded, and we then got the ether theory. Now we have got to the ether-jelly theory, and it is possible a little later on we may get to the substantial theory; but at all events, light is not to stand still in the ether-jelly stage, I am quite certain. There are other minds coming which will probably grapple with this question, and who will send the ether-jelly theory of the present day into the limbo of exploded hypotheses, to follow Newton's corpuscular theory. I recognise light, electricity, and sound as all great forces which do not depend on any mechanical action whatever. It was said that membranes are affected by a sounding instrument: doubtless, and in the same manner as are the films mentioned by Mr. Sedley Taylor. Where you set up a sympathetic vibration you are able to get most wonderful results. The membranes alluded to are amongst the series of experiments I alluded to when I mentioned that sympathetic vibration ought to be more studied.

Mr. BLAIKLEY.—I do not consider it a case of sympathetic vibration in the cases I mentioned.

Mr. AUDSLEY.—Then a question was put about organ pipes,

stopped and open. I should explain the matter thus: air has the peculiar faculty of creating in itself, where it possibly can, a sympathetic column. In an open pipe you know that the vibrations at the mouth divide that pipe into two great columns divided by a node. Cut that pipe in half and stop it, and you have very nearly the same pitch of sound. In stopped pipes you cannot create the same double column; the column is confined to the resonance chamber. With the revolving syren, with puffs of air sent into the atmosphere immediately in the neighbourhood, it creates vibration which releases the sound force from the atmosphere just the same as a tuning fork opposite a resonance chamber releases the sound force from the volume of air retained within. All you have to do is to disturb the molecular structure of the sonorous body. I want you to understand very plainly what a sonorous body is. If it is merely capable of vibration every body is equally sonorous, but a piece of wood that is made to move to and fro 256 times in a second with the same amplitude as a tuning fork will not only not be heard, but would not be heard if it so moved an inch at each swing. So long as you do not disturb the molecular structure of the wood you do not get any sound from it. Tap it and immediately you get a sound. The whole theory of a sonorous body lies in this fact—that its structure is so constituted by nature that when it is set into vibration its molecular structure releases two forces—one is heat and the other is sound—and in proportion as the sound force predominates over the heat force, so is its sonorous quality improved. There are some bodies that release practically no sound force at all under ordinary conditions, and the result is that the mechanical energy expended in their vibration is entirely displayed in heat. I think that is about all I can venture to say to-day.

The CHAIRMAN.—I am sure you must all rejoice that this subject will be resumed on another occasion. I am sorry to say it cannot be during the present session, because all the dates are filled; but we have Mr. Audsley's promise to come amongst us again, when we shall hope to be able to thresh the matter out more thoroughly.

A vote of thanks was then passed unanimously.

MAY 5, 1890.

MAJOR G. A. CRAWFORD

IN THE CHAIR.

FURTHER "NOTES" ON THE ORGAN. SUGGESTED BY PAPERS OF SIR F. A. G. OUSELEY AND MR. AUDSLEY.

By SOMERS CLARKE, F.S.A.

IN venturing to read this paper, I have not undertaken the work with the view of giving instruction, but rather of eliciting information from those who are better able than myself to teach.

I hope also that it will not be thought I am going over old ground; I hope to avoid this, although I am aware that two papers have already been read here, and which deal with the organ, one by Mr. G. A. Audsley, the other by Sir F. A. G. Ouseley.*

The subject—namely, the treatment of the organ with regard to its position, the provision to be made for it, the position of the keyboard, &c., is so large that the papers above referred to are by no means exhaustive. They have indeed suggested many questions, some of which may, perhaps, find an answer to-day.

The historical side of the case, that upon which Sir F. A. G. Ouseley first enters, is very interesting. The paper read by Mr. Hopkins, and published in the Transactions of the Archæological Institute, goes very fully into the subject and, I think, with much more sound views than those expressed by Sir F. A. G. Ouseley.

For the present, however, I do not want to introduce history or archæology into the field, but to consider the subject as we find it before us to-day.

There has been a sufficient change in our ritual, knowledge of music, construction of organs, and mechanical resources

* "On the Position of Organs in Churches." Sir F. A. G. Ouseley, Bart. Proceedings, Musical Association, 1885-86.

"Matters, chiefly Architectural, relating to the Accommodation of Organs." By George Ashdown Audsley. Proceedings, Musical Association, 1888-89.

to place the whole question upon a very different footing from that on which it stood, even thirty years ago, and we have to deal with things as they are.

With regard to the position of the organ in a church (and I propose to deal with church organs only), it does not seem reasonable to cite, as is commonly done, the arrangements at churches such as Milan, Seville, Cologne, Strasburg, and others, many of them buildings larger than our biggest cathedrals or abbeys, and then to draw any deduction from these to apply to our ordinary parish churches. We might almost say that in England we deal with inches, where these spacious structures deal with feet, so great is the difference in scale between the buildings.

This difference may be found even in our parish churches. Let us compare for a moment two great cities, London and Paris. London has in it only two large churches, St. Paul's and the Abbey. In Paris most of the older parish churches are more spacious than, although not actually as long as, Lichfield, one of our smallest cathedrals, whilst the Pantheon, St. Eustache, St. Sulpice, and others are on a very much larger scale. Most of our city churches, whether in London or elsewhere, are quite toys when compared with those across the water, and our modern efforts at church building are, in comparison, equally small. We keep to the old traditions in this. We think St. Alban's, Holborn, or St. Augustine's, Kilburn, large modern churches. They are, literally, not half the size of an average modern French church. Under these circumstances, we must be careful in our judgment, and compare like with like, not assuming that what is acoustically successful in one place will equally succeed in another.

It is, too, the exception to find a foreign church which is not stone vaulted. Stone vaulting is not, and never was, common in our land.

Some of our noblest churches of the first magnitude are only vaulted in part; it is rare indeed to find a vaulted parish church. A stone-vaulted roof has a wonderful effect on organ tone, adding that mystery and resonance without which the true grandeur and magnificence of the instrument is half lost. We can note this for ourselves by observing the quality of sound in a vaulted church like St. Peter's, Vauxhall, which is but a small building, with the quality of tone in an ordinary open-roofed church of about the same dimensions.

Mr. Audsley, in his interesting paper, gave us a glowing description of a wondrous cathedral which must have a choir bigger than that at York; and which was exactly what a mediæval architect, had he had our conditions of a small capitular body and large congregation, would never have built.

My purpose is to leave the realms of fancy and come to those of fact.

The first question we come upon is that of the position of the organ in the church. There is a good deal of debate about this. Sir F. A. G. Ouseley says truly that there are many interests to consult. He enumerates those of the clergy, the singers, the organist, the architect, and, lastly, the organ builder; but he leaves out the people—why should they be forgotten? and it strikes me—but I may be wrong in this—he leaves out what I must call the ritual point of view; and, when he speaks of the organ's position in parish churches, he is constantly running for his comparisons to cathedrals. I find, too, that in the discussion which followed the reading of Sir F. A. G. Ouseley's very interesting paper, St. Paul's, St. Peter's at Rome, and such trifles are more freely mentioned than modest parish churches such as we grow in this little island. I find, too, that after Mr. Audsley's paper was read, our ideas were large—we talked about cathedrals and such big things more than about those buildings with which we have every day to deal.

Let me invite you to "climb down" and consider ordinary parish churches, living no doubt in hope that folk will agree as time goes on to build them larger, which they are even yet beginning to do.

What is the church built for? This I will try to answer, hoping that others may agree with me.

It is built as a place in which divine worship is to be celebrated, and worship it must be remembered is not the same as prayer. A magnificent musical service, in a magnificent place, is the highest exemplification we can give of divine worship; and not only the clergy, but the people are interested in it, and assist in some way or other.

Who settles what this worship is to be? There have certainly been disputes of late on the interpretation that may be given to the rubrics, but the basis common to all parties in the church is the Prayer Book.

It must, of course, be understood that I do not for one moment wish to enter upon the ground of religious controversy, High Church, Low Church, &c. This is neither the time nor the place; but I imagine that any musician would consider that within the four corners of the Prayer Book (and that is the book of directions with which we have to deal in our churches), a musical high celebration gives the largest field for rendering magnificent worship.

In arranging a church the ability to render magnificent worship should not therefore be impeded.

There was a time when organs and singers had migrated to the west end. When the body and often the galleries of the church were full of square pews, it really did not matter

where the singers were situated, they were sure to have some one looking at them in their pride of place, as people faced all ways. We can recall the gallery, with its brown front made as it seemed of gingerbread, and covered with shiny treacle, a pallid clock-face in the middle, and over it a nice cosy red curtain to hide the organist, being a modest man. The select company of singers, not equally modest, did not require red curtains. The organ rose behind, flanked by tiers of charity children. Magnificent worship was not got in this way.

We seem to have agreed, notwithstanding many divisions of opinion on religious matters, that this was not nice; and on looking back it was found that it states in the prayer book: "And the chancels shall remain as they have done in times past." I cannot go into the whole question now, it is one of history; but I think you will find that in the "times past" the chancel was the place where the music was rendered, and if not intended for the purposes for which we once more use it it is difficult to understand why this part of the church was planned as it was.

The more the subject is considered the more clear does it seem to me that historical continuity fixes us to the chancel.

But let us now conceive ourselves to be members of the congregation. If we are to admit the propriety of ornate worship, why is not the eye as well as the ear to be studied? The very fact that we now aim—as did our forefathers—at building a dignified type of church, and also at decorating it very considerably, shows that the old prejudices are dying out, and that people do not now think well to have splendid drawing-rooms but bare churches. And, happily, ornament in a church is no longer considered a party badge.

I contend that—at least to me as a member of the congregation with, as I hope, artistic instincts—a fairly large chancel, the choristers in it, and the music they perform therein, are all more dignified and impressive because the whole scene is before me, and there is complete unity in it. Break this up and you lose a great deal.

I must not dwell longer on this side of the question, time will not permit; but I have said enough to show why, as I contend, the chancel is the right place for the choristers, and will, in ninety-nine cases out of a hundred, continue to be used as such.

If the choristers are in the chancel the organ must be near them. Sir F. A. G. Ouseley says, speaking of organs in the west gallery (p. 83): "and indeed it *must* be there if the singers sit in the west gallery." He evidently thought that the two must be together, and his statement applies as well to the chancel as it does to the west gallery.

We all know that the organ must have plenty of space

about it, height above it, and must not in itself be crowded; but there are other points on which the opinion of experts would be of great value.

One of these is the position of the keyboard with regard to the organ and the choir. Custom, ruled to a great extent by expense, makes it usual to place the organ on one side of the chancel and the organist close to the organ. The organist cannot hear his choir very clearly. The half of the choir nearest to him sings away from him, the other half that sings towards him has the first-mentioned half intervening. He is generally so near the organ that he cannot clearly hear how much or little noise he is making (and my experience is that to be on the safe side he generally makes too much); and lastly, having the organ and voices so close at hand, he knows but little what the congregation is about.

As far as the choir is concerned the rules of ample space, height, and width are as essential for the welfare of voices as of the organ.

What then would be the conditions of an ideal position for the organist?

1. That he should hear his choir well.
2. That he should hear the organ well.
3. That he should be able to see the choir well and also see the clergy who may be serving at the altar.
4. That he may hear the congregation at least fairly well.
5. That he shall have a tolerable sight of the nave of the church and thus be able to keep his eye on processions or other functions taking place therein.
6. We might add, that he should be able to use the organ in connection with a side chapel.

Where all these combinations are to be found I do not know. In a parish church of good size they would be difficult of accomplishment. They are not often approached in a church of the first magnitude.

I will now name certain churches where various positions of the organ, the organist, and the choir lead in a direction away from what I may call the old stock-pattern of the organ—in a hole on one side of the chancel, and the organist in more or less of a hole in the organ.

I shall, in these instances, go outside the limit of parish churches, because, if the latter be sufficiently large, the big churches may teach us something.

The opinion of organists upon the relative merits of the instances I am about to mention will be of the greatest value, and particularly will they be instructive to architects, for they have to do their best in giving accommodation to the interested parties, not only without sacrificing the effect of

the building as a church, but being, as a rule, hampered with want of funds.

St. Paul's Cathedral. This church has acoustic qualities which make it quite different from any other building in this country; but the position of the organ, hanging in halves above the choir stalls, is such as would not be out of place in lofty churches of less magnitude than the Cathedral. Indeed, were there shallow recesses in which parts of the organ could be placed, the scheme would be quite practicable.

In St. Paul's the alteration and re-arrangement of the choir is, from the most comprehensive point of view, a failure, because the result has been to turn the building, never intended to be so used, into a monstrous and overgrown parish church with nave and chancel.

The organist sits on the north side, in the north half of the organ, and about eighteen or twenty feet above the choir. I say, advisedly, *in* the organ, for he is boxed in to an extraordinary degree, and, I think, a plumb-line dropped from the great diapasons overhead would almost fall behind him.

From his place he hears the voices most perfectly. I should suppose that nothing could be better in this respect. He can hear the swell and choir organs which are on the south side of the church very well, but the great organ is most imperfectly heard. The diapasons, very much overwinded, as I venture to think, puff and whistle to the exclusion of all other sounds. The result is that, unwittingly, the voices are often completely drowned when the great organ is used, partly from the reason above given, but in part because there are not enough stops of a moderate power on the great manual, which is forced up to fill the whole Cathedral, and has not wherewith to support the voices in *forte* passages.

Supposing a similar arrangement of divided and suspended organs were placed in a lofty church, some fifty or sixty feet high, the organ being fifteen or eighteen feet from the ground; would it be best to put the organist in the gallery with the organ, or to place the console somewhere below? Organs so placed would, in an ordinary church, serve the nave as well as they would the choir.

I ought, perhaps, to remind my hearers that, in the sort of waltz which the choir fittings have taken round the eastern limb of the Cathedral during the last twenty-five or thirty years, there was once a time when the organ was in the middle arch on the north side of the choir, and the organist was placed below. This arrangement of the keyboard was found to be unsatisfactory. The keyboard was put up in the gallery with the organ. The instrument, smaller than at present, was all on the north side, and was probably better heard by the player than it now is.

We will now take flight to Westminster Abbey, where the acoustic difficulties of the building are not great, and where the organ stands well in the middle of its work. The organ has the same number of stops as at St. Paul's. The building contains less than half the cubic capacity. From this we may readily understand what a tax is laid on the Cathedral organ, and why it is likely to fail in some respects.

The Abbey organ is divided, part on the north, part on the south, whilst the choir organ and keyboard are on the screen in the middle and at the west-end of the choir. The pedal organ is more incorporated with the organ thus divided than at St. Paul's, where it is all on one side, an arrangement which would, I believe, be very unsatisfactory were it not for the peculiar acoustic qualities of that building. The organist can hear his organ admirably. He can see both up and down the church most perfectly, but the choir is not so pleasantly audible to him as at St. Paul's, nor is the choir organ so immediately near the voices. I fancy, however, that in no building will the keyboard be found better placed, taking all things together, than at Westminster Abbey.

The question immediately arises, what profit can be gained from considering Dr. Bridge's advantages, and how can they be applied in ordinary cases?

We will now take the tram and visit St. Agnes', Kennington. I think that in that church we may get nearest, on a moderate scale, to the Westminster Abbey scheme; not that it has yet been done.

We find ourselves in a good-sized parish church, some forty-five feet high, high aisles, no chancel arch or break in the levels between east and west.

A shallow transept of the full height of the church projects north and south immediately at the entrance to the chancel. At this point the church is crossed by a high screen, with a loft on it. A small organ stands just in the north transept on the loft, and having plenty of space about it, tells with good effect. It is, indeed, far more effective than most organs three times its size put into the regulation rat-hole. I have not been into the church for a few years, and some of the objections I am about to raise may have been met, but I do not see how it can have been done.

The greatest objection I observed was that the organist could not see the choir, although it was easy to get a fair view over the church. Although, perhaps, no higher up than the organist at Westminster Abbey, the shortness of the parish church chancel as against the Abbey choir placed the singers almost under the keyboard at St. Agnes'. The choir could neither be well seen nor heard. The limits of size of a parish church must always present this difficulty, and the conclusion seems forced upon one that although we may,

with excellent effect, get the organ divided and overhead, an arrangement much facilitated by a screen and loft, we cannot put the keyboard there.

If the choir be enforced by a band, the loft may suggest itself as a good place; but the objection again presents itself that it is difficult for a conductor below to be seen by the band above, unless he stands so far east as not to be well placed with regard to his choir.

Supposing, therefore, that the organ be above and the player below, would it be considered best to place him just behind one or other row of stalls, or somewhere east of the stalls with a long action? In that case he would have the voices and organ between himself and the congregation, but he could accompany the service at the altar well, and could use the organ for the side chapel.

We have in London another instance, besides those at St. Paul's and Westminster Abbey, of a divided organ—viz., All Saints', Margaret Street. The sub-divisions are in this case placed in the aisles of a short chancel. The openings and surrounding spaces are not large. The organist sits in the north, facing south, and can see his choir and get a fair view of the church in all directions.

Could the position of the keyboard be improved upon?

It is an accident that in this case the church is small.

In another London church, St. Matthew's, Great Peter Street, Westminster, rather lofty and spacious for an average London church, the chancel has an aisle on the north side only. In this the organ stands. The keyboard is placed against the south wall of the chancel, just east of the stalls, the action under the floor. The chancel not having been originally planned for this arrangement, the organ console forms an ugly packing-case construction; but this could be avoided were such a position for the keyboard provided for in the original designing of the chancel. The organist is east of his choir and of the organ, but has none of the choir between him and the organ.

I do not think that, as yet, an organ has been placed in any of our modern churches behind the reredos and altar. In the old preaching-house church of fifty years or more ago the organ occasionally climbed into a gallery in some such position. I think it was to be found there in Marylebone Church. It was, in fact, the old west gallery arrangement.

There is no architectural or ritual reason why the organ should not be placed at the east end of the church, standing on the floor, and screened off by the reredos, and in part incorporated with it. So long as the organ was not the principal object its position would be right enough. But where should the keyboard be?

There is one great objection to the organist sitting in the back row of the choir stalls.

In the first place, the space he must occupy makes an ugly and unsymmetrical gap in the row of choirmen, and prevents the numbers being balanced or equal on each side of the chancel.

If his seat be kept back, the organ being in the aisle so that the choirmen can pass along between his seat and the book boards, the gap is still there occupied by one man sitting and facing one way whilst the others are standing and facing the other.

If the keyboard is incorporated with the book-board and he faces into the chancel he still makes a gap, and the pedals, &c., form a thorough block in the passage. In fact, this arrangement is simply abominable. In either case the organist must surely be too near the choirmen.

It is not satisfactory, as a rule, to place the organist under any part of the organ. When this is done, he is not only under, but often more or less in it.

How far the objection may hold good in such an instance as the following I cannot say.

There is a church of very considerable size—one of the largest English parish churches. The roof, continuous all through, is fifty feet and more from the floor. The whole building is seventy feet wide internally, the aisles being each of them eighteen feet wide and thirty feet high. It is proposed to divide the organ, putting part on an open screen behind the stalls on either side, and the choir organ on the chancel screen. It is proposed to place the keyboard on the floor behind one or other row of stalls, and consequently under one division of the organ. Considering the openness of the position I doubt whether the position will be disadvantageous, more particularly as it is proposed that the choir organ shall be that which its name implies it should be — an organ capable of accompanying the full choir and not a mere half dozen pretty stops useless in *forte* passages.

As I am not pretending to instruct, but rather to seek information for the benefit of myself and others, I shall now venture to take a little journey inside the organ, and I do this especially with regard to the remark that has just been made as to the inadequacy, as it seems to me, of choir organs. The organ of St. Paul's Cathedral, as I have before hinted, seems a conspicuous example of this fault. The choir organ is by no means sufficient to support the full choir.

But at St. Paul's, and in many other cases, the stops on the great manual are voiced with regard to the whole church. As an accompaniment they drown everything; the swell does not in any way make up for this. To those close to the organ the swell may make a very tolerable accompaniment,

as it can be heard even when tight closed; but go half-way down an ordinary church, when the congregation is singing, and the closed swell is hardly audible, nothing but a muddled buzzing is heard, whilst the tranquil clear sounds of the choir organ would be sufficiently audible and yet not loud.

When the swell with reeds is closed — and for some mysterious reason the swell seems always in use—the flattened buzzing is most disagreeable.

The larger the church the less disagreeable is the effect. In the largest buildings it is not in the least disagreeable. Unfortunately, we have one large church to a hundred or two of ordinary size.

The laying out of the interior of the organ with respect to the position assigned to the various sub-divisions, and the effect the sound of these sub-divisions will have on the auditor seems much neglected. I frequently observe that in the case of an organ of considerable size, built in one block and placed on one side of the chancel, the pedal department is all in one place, which may be considerably removed from one of the manual departments with which it has to work. One hears all the pedal notes coming distinctly from one place, whilst the tones they are supposed to support come from another. Sitting in the aisle of a church, this breaking up of the sources of sound is often most unpleasant. The organist is, probably, not at all conscious of the state of things. The organ-builder is the man in fault, and he can generally shelter himself behind the statement that the architect has neglected to give him either space or openings sufficient. But, given plenty of space in all directions, I cannot but think that each department of the organ should, as far as possible, have its pedal-stops placed near the manual-stops. At any rate, those of delicate tone should be so placed.

The opinion of those who have gained experience would be of great value in another point I am about to raise:

Is it not important to the organist that the sound-boards should be kept well above his head, or, failing this, that he should be shielded in some way from the direct impact of the sound of the full organ?

In the case of an organ raised in a gallery above the stalls of an ordinary church there is not likely to be height enough in the building to admit of some seven or eight feet of space between the floor of the organ gallery and the sound-boards. In order to get height above the instrument there will be a great temptation to lower the pipe feet, and if the player be up in the gallery his position will be intolerable. I observe that even at Westminster Abbey Dr. Bridge has constructed a primitive sort of screen to shield himself from the *forte* of the swell. At St. Barnabas, Oxford, a low building, with very

depressed aisle-roof, the organ has been lifted off the floor to the level of the spring of the nave arches, and a sort of box projecting from the wall of the width of the aisle has been constructed. The organist sits in this den with the organ, which nearly fills it up, and I have heard a rumour that the brains of one man have already given way under the trial. I think it certainly is the most ugly and dreadful place in which I ever saw an organ put, and must simply be torture for the player.

Another point for consideration:

The organ, in these days of mechanical skill, is becoming more and more complete. We shall probably attain to greater development in the imitation of instruments used in the orchestra, whilst the absolute command of an instrument of almost unlimited size is made easier and easier.

Under these circumstances is it not expedient that we should begin to classify the instruments, and frankly accept that there may, or, as I contend, there positively should, be a distinct difference between the effect aimed at in an organ for a church or for a concert-room? At present there seems to be a mere vulgar desire to have the biggest thing possible, and to outdo the next neighbour. King's College Chapel, a building enclosing a very great space, must needs have a bellowing double tuba. One can just tolerate such a thing at York Minster, beside which King's Chapel is but a moderate sized edifice. But close by stands Trinity College Chapel. No sooner has the King's organ been enlarged than Trinity must follow suit, and the organ, already much too big, throws out a hideous crop of thirty-two foot pipes, for which there is no room, and they deface and encumber a building which does not contain, I suppose, half the cubic contents of King's. So we go on, if only people are silly enough to find the money.

Would it not be better to admit that a great number of very pretty and of imitative stops, thoroughly suited as they are to an orchestral organ, are not needed where the music is of a grave and dignified character; and that mere noise is not music at all? In the building of churches the architect is expected, and very rightly, to leave out light adornments. A certain gravity, simplicity, and as much of grandeur as he can command are looked for. Why in the scheming of organs should not the same feeling be studied? The most noble diapasons and everything else of the best, but nothing that can be tortured by unskilled hands into vulgar display.

I believe that there are few of us who would not be offended by a highly dramatic reading of the lessons, with gesticulations, changes of voice, &c. Indeed, such a rendering would not be a reading but a dramatic recitation.

To me the attempt at a dramatic accompaniment to the

Psalms, which we so often hear, is equally offensive. There are, of course, skilled hands that can do these things; but how many more over large organs have we than men who can use them well?

I venture to believe that it would be better for the organ in an average church to have in it but little more than those stops which are really necessary to give a good and sufficient accompaniment. I also believe that all the noblest organ music could be properly rendered on such instruments, and if the hurdy-gurdy modern French pieces could not be played thereon, should we lose anything? To pander to the love for the "pretty" the swell is often made large at the expense of the pedal.

I feel that although I may have exhausted a patient audience, I have by no means exhausted the subject.

The questions I have tried to raise will, if answered, be of use to architects, and just at this time it will be helpful that these and many other kindred matters should be fully considered as being on the lines laid down for the deliberations of a committee of members selected by the College of Organists and the Institute of Architects.

I ought, perhaps, to state that this paper was nearly completed before this committee was formed, and going in part over the same ground was, in the nature of things, unavoidable.

DISCUSSION.

THE CHAIRMAN.—Ladies and gentlemen, we have had a thoroughly practical paper, which has thrown out a great number of suggestions. There is one gentleman present who, I believe, has furnished to some extent the theme of that paper, and I will call on him to commence the discussion.

Mr. AUDSLEY.—You pay me a very great compliment, Mr. Chairman, but my remarks will be very brief. I must in the first place bear testimony to the ability and knowledge displayed in my friend Mr. Somers Clarke's paper, and I cannot help regretting that it is so short. He has touched on matters in such a skilful way that I cannot help wishing he had developed his paper more in detail. From what he has said it is evident he could have supplied from his own personal knowledge a paper of a much longer character. I agree most thoroughly with Mr. Somers Clarke on one subject, and that is the usual overblowing of organ pipes. His remarks specially alluded to the diapasons of St. Paul's organ, and if they had reference to them only, one would not feel so much regret, but they apply equally to a very large

number of important organs constructed under the present system of organ building. The blowing of organs with higher and higher pressures of wind, whereby they are rapidly approaching the tones of steam whistles, is very much to be condemned. It is impossible to have a church organ with that dignified, grand, and rolling tone, which is such a fine accompaniment to the human voice, if one overblows the pipes; one will produce a false character of tone, which is extremely offensive, and which will not blend with the human voice. With regard to placing the claviers in the choir stalls, I do not quite see the impossibility of managing the arrangement desired in a more simple manner than has hitherto been done; but that involves architectural questions, which would be quite undesirable to bring forward now. I think we must look in the future to have the position of the claviers somewhere on the ground floor, as near as possible to the choir stalls. The exact position of course will be dictated by special circumstances; but I think myself, from long observation, that it is decidedly beneficial for the organist to have a very clear idea of the effect he is producing to the ears of other people in the building. He is not playing the organ for his own hearing, nor exactly for the hearing of the choir, beyond accompanying and leading it, so his position should be one from where he can form a fair idea of what the congregation are listening to. That is an important consideration with regard to the position of the organist. He plays for the glory of God, and for the benefit of the congregation; and I think the benefit of the congregation is the question we have to consider at the present moment; therefore he ought to be placed in a position where he may be able to form a correct idea whether he is drowning the voices or not, which organists very often do. The treatment of the Swell Organ is a matter which we might profitably discuss at some length, especially the imperfect manner in which Swell Organs are at present constructed—that is to say, with the desire to get the effect of the swell when closed to be so absolutely an annihilation of sound that it is no longer a musical instrument at all. In that condition it is more like the buzzing of a bee in a bottle than the musical tones of an organ. I think if swells were more accurately constructed we should not have that sudden burst one hears when the swell is opened and then closed. The effect should be similar to that of an orchestra when playing *piano* or *pianissimo*—it should be soft, but every quality of the tones should be present. If the swell is constructed scientifically so that it shall not absolutely kill the sound when closed, a great evil will be cured which obtains in most modern organs, or, at all events, it will be very materially diminished. To construct swell boxes three inches

thick with two inches of wood, and the other inch stuffed with sawdust or felt, is one of the most absurd modes of proceeding one can imagine. A swell box of an inch and a half thick, properly constructed of solid wood, will give all the *crescendo* required, and will not kill the sound when it is closed. There is no question that the present system of swell-box construction is destructive to the legitimate effect of the Swell Organ. With regard to the stops of the Pedal Organ, there is no question Mr. Somers Clarke is right if we recognise the fact that the Pedal Organ is the legitimate bass for the manuals departments, and not an altogether independent department. The chief office of the pedal stops is to carry down the chief stops of the manuals and to supply the bass thereto. It is desirable, when practicable, that those basses should be as near the corresponding manual stops as possible; but there are great difficulties, of course, in stowing basses of sixteen feet length and of corresponding scale just where they ought to be. The difficulty can only be overcome when there is practically unlimited room, but where you have ample space they should be placed by the side of those stops with which they are most frequently used. It is very desirable that there should be no apparent break when one stop begins and the other ends. With regard to the different kinds of organs, it is remarkable that Mr. Clarke should have made so many remarks in his paper which have been written by myself at some length elsewhere. There are three different kinds of organs which have entirely different starting points and entirely different terminations. The Church Organ, the Concert Organ, and the Chamber Organ should each be planned on special lines as they have distinct and special offices to fulfil. The Church Organ should be built from its own standpoint. It should not be an orchestral organ; it should not be made an organ for display, but should be made an organ to accompany the service in a dignified and refined manner. The departure from this rule has been the destruction of organs innumerable. Fancy stops and ear-ticklers, as I have called them, should not be put into a Church Organ; at all events, until that organ presents to the full the necessary qualities for a Church Organ. But in numerous Church Organs recently built you will find that the diapasons, and all the grand foundation work of the organ, have been seriously reduced to find room for such fancy stops. The Concert Organ must, of course, have all the groundwork of the organ proper, but beyond this there is unlimited scope for developing all the modern appliances; you can place in it all the imitative stops which can be pressed into the service by the ingenuity of organ builders and voicers. Again, in a Chamber Organ you do not want to listen to the grandeur

which belongs to the Church Organ or the vast resources of the Concert Organ. You want to listen to an instrument suitable for the place it occupies and the work it has to do, and which would be out of place elsewhere. In any shape, I hold that the organ is far too noble and far too dignified an instrument to be lowered in any way by the introduction of anything which is, strictly speaking, outside its legitimate aim and end.

Mr. Wesché.—While agreeing in many things with Mr. Clarke, on some points I must join issue with him. In the matter of dramatic accompaniment, for instance, half the effect of the accompaniment is the meaning of it. If you write music to a Psalm or hymn, you endeavour to put as much as you can before your hearers of the meaning of the words. So also in playing an accompaniment. If the player has any power or feeling he will try to bring home to his hearers the power of the hymn or Psalm. As regards the size of organs, you should have an organ as big as possible for the size of the church, and not a bit bigger. The matter of placing the organist is a very important one, as it is essential that he should hear the choir. Everything else should give way to that. The precise position depends on the church, as every church I am acquainted with has different acoustic properties. I think one of the best places I know is St. Andrew's, Wells Street, where they have placed the organ up in the gallery about eight feet above the choir stalls. In another church which has rather a narrow chancel the organist is placed in a similar position, but he cannot hear the side of the choir that is under him. So that you cannot make any hard and fast rule. I should think a console somewhere in the middle of the choir, so that he could hear and not be impeded in any way, would be the best position.

Mr. Webb.—I think the golden rule in placing an organ in a church is to give plenty of room all round it, and then you will not require an instrument half the size. The organist should not mind where he is placed provided he can hear what he is doing, therefore he should be at some distance from his instrument. My own experience is that if you want to hear how the organ sounds the only way is to get someone else to play it to you, and then you can get an idea of the effect you produce. I quite agree with Mr. Audsley that you should give an organist as good an organ as possible, but the size should be regulated by the church. As a general rule, an organ which would cost about £1 per head would generally be sufficient. The most money should be spent on a good bass, building up the organ from the pedals. As regards the many fancy stops we get now, organ recitals are an established

fact, and have also an influence on musical education. Therefore, you want an organ which can produce certain concert effects. If you have a well-trained organist, a man who is a thorough musician, he will not introduce fifes, cymbals, bells, and that kind of thing in the service. Nothing has done more to develop and raise the musicianly capabilities of organists than the instruments which have been placed at their disposal. They have given recitals, and to give recitals you must have an increased knowledge of music. The consequence is a more universal knowledge. It is quite a different thing to give a recital and to accompany a service, and the result of the recital giving is that our organists are no longer kapellmeisters, but many of them are practical musicians, who have produced works of considerable value and importance. I am, therefore, in favour of organs being not too large for the church, but certainly as large, and with as great a diversity of stops, as can be afforded.

Miss Prescott.—I agree with Mr. Clarke in disapproving of these orchestral imitations in the organ, as they are nothing but bad imitations; they never sound like the real thing. I do not think we want them, even in a Concert Organ—one that is to be played with the orchestra—because the real thing is already in the orchestra, and we want in the organ a purely organ-effect, and not imitations of oboes and flutes, and of the human voice singing through its nose. Of course an organ recital is another thing altogether. I have been told of an organ recital in a church in Switzerland where they imitated every instrument in the orchestra. It was a wonderful performance, but the people came away saying it did not sound a bit like an organ. I do not think organists recognise what the organ tone is like, or how little they know about the sound of the organ when they are playing. I have heard a melody played very nicely on the organ, which, in the distance, sounded like consecutive fifths all through, and certainly the organist did not mean that. There is a church in Bristol which I do not think has quite the same arrangement which Mr. Clarke mentioned—I mean St. Mary Redcliffe. The organ is divided on both sides of the choir, and the player has his back to the choir; but he is a little bit above its level, just behind the pulpit, so that he is hidden from the body of the church. At the same time he can see the choir quite easily. It seemed to me a very convenient arrangement.

Mr. Audsley.—Probably some of my remarks may have provoked the observations of Mr. Webb and Miss Prescott. With regard to orchestral stops I may have expressed myself rather badly. As to the Church Organ I quite agree that so soon as you have the organ properly appointed for everything it has to do as a church instrument, there is

no objection to superadding these fancy stops or orchestral stops; but, unfortunately at the present time, my personal observation leads to this conclusion, that these fancy stops are put in at the sacrifice of the legitimate part of the Church Organ. With regard to the recitals and matters of that kind, I should not wish it to be understood that I should ever think of recommending an organ to be put into an important church that would not be capable of lending itself to the full range of music suitable to be played within the walls of a church. On the orchestral aspect of the question I differ very materially from Miss Prescott. I think a Concert Organ may very legitimately have every imitative stop that the ingenuity of the organ builder or voicers can produce. There is the true province for organ recital. When such an organ is played with the orchestra, no organist, if he understands his business, will think of bringing in the imitative stops. The Concert Organ must have the true foundation of the organ, and then have the imitative stops superadded to it, so that of course you have both resources. The true Concert-room Organ is both an accompanimental and a recital organ; and it must be capable of furnishing legitimate aid to the grand orchestra in the most effective manner. May I ask the name of the place in Switzerland which Miss Prescott referred to?

Miss Prescott.—I think it was Fribourg.

Mr. Audsley.—I know Fribourg very well indeed, and I spent two days in the inside of the organ, and did the same at Lucerne along with Herr Haas, the talented organ builder. I know nearly every pipe in the Fribourg and Lucerne instruments, and can assure you they are legitimate organs, although they contain a few imitative stops. Both those organs are of the good old-fashioned German church type, with plenty of diapason character, not quite the English diapason tone; of course they are not imitative organs in any way comparable with that in St. George's Hall, Liverpool, or the Albert Hall, or any of those organs that we consider of the orchestral type.

Mr. Makins.—As a visitor I should like to say a few words upon an organ, with its position and arrangements, which proved most effective. It was a two-manual organ, having eleven stops in the great organ and eight in the swell, with three on the pedals. It was placed on a stage erected on the south side of a chancel, and occupied a shallow site at about twelve feet above the chancel floor. The back of each manual soundboard was not many inches from the wall. The great, swell, and pedal soundboards were all upon the same level, the two former in a line with each other. Looking from the front the great would be seen on the right hand, and the swell on the left; the pedal was in the

front, and its sixteen-foot open stop, of good scale, and in fine spotted metal, formed the centre front of the case; behind this stood a sixteen-foot Posaune and a Bourdon of sixteen-foot tone. The key-board console stood on the chancel floor, just behind the reader's desk; its key, stop, and composition-pedal movements passed up to the soundboards in a casing fixed against the chancel wall. Outside the chancel was an entrance porch to the church, and over this a good-sized chamber approached by a ladder; this chamber contained the bellows and blowing arrangements. The organ was most effective in the church, very agreeable to the player also—who, hearing his instrument perfectly, yet heard the voices equally well.

Mr. Wesché.—The real points raised are, what is the legitimate organ tone and what is the use of reeds? If the organ is used with the orchestra, what is wanted particularly is an instrument with the legitimate organ tone. If a composer writing for the opera wanted to introduce the organ, he would naturally use the diapasons and the mixtures. I believe that organ in Fribourg has any quantity of mixtures.

Mr. Audsley.—All German organs have, but they are very loud and screamy. You can only use them with a full organ. I think this is a very great mistake.

The Chairman.—Although we have had but a small attendance to-day, there has been a very interesting and rather considerable discussion, and we have arrived at several conclusions, on which I think we all agree. I am not a practical organist, and, therefore, I wish that either the President or Dr. Bridge had been here to-day to take the chair, when no doubt we should have benefited considerably by their practical knowledge. But speaking as an ordinary member of a congregation who takes a considerable interest in church music, I must say that there are several things which have often struck me. One is, that there is too much noise. Another is the unartistic use of the stops. Of course, if we had all first-class, highly educated organists, it would be an entirely different thing; but unfortunately that is not always the case, and we frequently hear a most injudicious use of the stops. In many places I think we have our organs too large for the space. Whether it should be that the space ought to be enlarged for the organ may be another thing, but as it is, the waves of sound have no room to expand and produce the grand, massive effects which one expects from an organ in a church; but you find all the sound coming from some hole where the organ is placed, and the whole effect is spoilt. I would infinitely rather have a smaller instrument than attempt to have one which has no room to show its powers properly. Before anything was said about organ recitals the idea passed through

my mind that a great deal has been done in building organs with a view to organ recitals in these days in churches, but that is a consideration which in a Church Organ for church purposes I cannot think of much importance. I do not see why a Church Organ should be used for anything more than its legitimate purpose, that of accompanying a choir, or performing such music as is necessary for the purposes of the service. I do not see any reason why we should have an organ with fancy stops put into a church merely that it may be used at a recital. The proper place for a recital is, to my mind, a town hall, or some other such place. If you use the organ in church let it be used as far as possible legitimately, but not otherwise. I do not like, as a general rule, organ recitals in churches, and I have heard more music misused at these recitals than I ever heard anywhere else. A friend of mine said to me only the other day—he had just come up from a certain town on the South coast—he was a clergyman, and he added: "I went into such and such a church, and I heard some music being played there that I thought was most improper in a church; they were playing nothing but regular jigs." I quite agreed with him that that is not the sort of music for a Church Organ. My theory is that the proper function of an organ in a church is to support and lend tone colour to the choir, but that beyond that the organist, as a solo instrumentalist, has no business in the church at all. If you want to hear real church music, where do you find it given with greater beauty and grandeur of tone than in the Eastern church, where no organ at all is employed? I certainly understood Miss Prescott to allude to an organ with fancy stops being played along with the orchestra itself, to be used simultaneously, but as far as my experience goes I have generally observed that when an organ is used in such cases those particular stops are silent, and the legitimate organ effect produced.

Miss Prescott.—What I meant was that they are not required in an organ which is used with the orchestra.

The Chairman.—But then you have the recitals to account for, which on a Concert Organ would be legitimate and proper. At the first performance of "Elijah" at Birmingham under Mendelssohn, the organ, as well as I remember, was used. Of course the organ part did not interfere with the scoring for the instruments.

Miss Prescott.—It had the effect of what you call the Church Organ?

The Chairman.—Yes, it was brought in to produce those great massive effects which are peculiar to itself. I think now we have had a very useful discussion and elicited many valuable opinions, and, so far as I can see, the consensus of opinion is very marked, that we want our church services

conducted properly, we want an organist to know his business and to be a trained musician, and we also want each particular class of organ used in its legitimate and proper place.

Mr. J. PERCY BAKER.—As regards orchestral stops in a Church Organ, we ought to remember that performances of sacred cantatas and oratorios in church are very common now, and have considerable religious value. It seems a little bit hard on the organist if he is to be debarred from making use of orchestral effects on such occasions, especially if he be acquainted with the full score of the work. Nevertheless, the primary object of the organ is, of course, to accompany public worship, and it must, therefore, in the first place be adapted for that purpose before these orchestral effects can be considered. I think a good many of our organists, especially amateurs, are misled when they go to recitals. They hear these ear-tickling stops, and when the time comes for them to have a new organ, they will insist on choosing stops which produce an overgrown swell and a very small great; instead of directing their attention to securing a good body and an adequate bass for their instrument.

Mr. SOMERS CLARKE.—I shall be very brief in replying, Mr. Chairman. First of all, I must thank Mr. Audsley for what he said, and I am very glad that he has already in print, although not yet published, remarks in the sense of those I have just made. I have been looking forward for a long time to his large book on the organ which is coming out. Dramatic accompaniment and orchestral effects and so on have been spoken of by several speakers. My contention is that the organ cannot yield a true orchestral effect. I go as far as to say that when you attempt to do it it is always more or less a failure, and I very much regret to see that any organist should desire to produce an orchestral effect, because it seems to assist in keeping out the real orchestra from the church; and I can tell you that that has actually happened. Nothing is so beautiful as to hear real stringed instruments, or others. When those are in the church we do not want the organ to be producing imitative orchestral effects, but only the broad, grand tones, which are the legitimate effects the instrument can best produce. When, however, one has to be all over the country, as is my fate very often, I hear a great many performers who are really more of amateurs than educated organists, and these gentlemen will have these pretty stops, and they play most considerable pranks. They are organists in the church, but are hardly professionals, as the greater part of their time is spent in an office, or in some occupation apart from music. The only wonder is that they do as well as they do.

Mr. WESCHÉ.—With regard to dramatic accompaniments,

I did not mean to imitate the orchestra, but to produce certain expressive effects. I understood you to suggest that the correct accompaniment would be passionless playing with the same quantity of tone right throughout.

Mr. Somers Clarke. — No. What I contend is, that music on the organ should be of a suitable character; grave, but with such tone and refinement as you may like to give. That will give a sufficient amount of dramatic illustration to the accompaniment.

Mr. Wesché.—You would play a penitential Psalm slowly and quietly, but if there were any change in the sentiment you would increase the tone.

The Chairman.—I confess I thought you meant a little more than that.

Mr. Wesché.—I do not mean using drums or triangles, or anything like that.

Mr. Somers Clarke.—When the sea roars then the swell bursts out. It reminds me of an organist who was considerably disappointed with an organ. He said: "I am not satisfied with the result; in fact, I cannot 'grin like a dog and run about the city.'" One knows all this style of silly tricks. With regard to organ recitals, I go so far as to affirm that an organ recital is, as a rule, a thing absolutely not worth listening to, because when it occurs the performer seldom plays grand organ music—music absolutely appropriate to the organ, but versions of something else, and you have a little piece from Wagner's "Tannhäuser," or what not. I fear, too, that with many players such enormous resources as an orchestral organ gives are almost sure to lead them astray. I can understand when a man is writing for the orchestra he feels very seriously what he has to do, and gets up his facts, thinks them out, and refines and polishes them; but, on the other hand, when he has simply the whole orchestra at his fingers' ends, it is a very great temptation to him, and the result often is that a member of the congregation, with a sensitive ear, is practically wearied out with his performance, and almost wishes there was a grinder. One speaker had remarked "that every organ should be as good as possible"; but the whole question turns upon what that might be taken to mean. There was one more statement I was going to make. I dare say it will not be agreed with; but my contention is, that so thoroughly undesirable is it to try and make one instrument imitate another, that I most distinctly object to hearing an orchestral accompaniment to a mass translated into an organ accompaniment. I am very fond of going to St. Paul's Cathedral, where they take every pains to do things extremely well. There is a certain service of Schubert's which is often performed there. There is a sort of imitation of violins, but it is

not in the least like violins, and it is not like an organ. It is not grand; you feel it is very clever, but that is all you can say. I would sooner hear Merbecke's Te Deum any day with a fine diapason accompaniment, because of its grandeur and simplicity. I can only thank you for your kindness in listening to my paper.

The CHAIRMAN then proposed a vote of thanks to Mr. Somers Clarke, which was carried unanimously.

June 2, 1890.

MAJOR G. A. CRAWFORD

IN THE CHAIR.

NOTES ON IRISH MUSIC.

BY F. ST. JOHN LACY.

It is the fashion now-a-days amongst the members of that class of society to whom the term of musical amateur belongs to express the greatest admiration for the folk-songs and melodies of the people. Unlike many of their tastes, this is one which, if rightly used, is worthy of great commendation, for nowhere can the characteristics and feelings of a nation be better read and understood than in the songs of their people. It is in their music that their real selves stand revealed, and it is in music that their inmost thoughts and feelings are expressed.

Speech, we are told, somewhat cynically, has been given us for the concealment of thought; but this is not so with music, that admits of no concealment; what the composer feels he must utter, and he cannot utter otherwise than as he feels. It is related of an eminent man that he once said: "Let me make the nation's ballads, and let who will make their laws"—intending thereby to convey that the power and feelings instilled into the people by their songs was greater than that instilled by their laws. In like manner, a musical antiquarian may be imagined to say: "Show me a nation's music and I will tell you the character of its people."

Unfortunately, however, this liking for national music is almost entirely restricted to that of foreign nations, whilst carefully ignoring the musical treasures of our own land. Passing over the music of Great Britain as foreign to the subject-matter of this paper, and confining ourselves to the consideration of that of Ireland, one is indeed at a loss to account for the neglect it has received, a music which, for depth of passion and richness of feeling, I do not think I am wrong in saying to be unequalled. In support of this statement I will here quote from a paper recently read by Professor Villiers Stanford before the London School Board, in which, speaking of the folk-music of the British Isles,

he is reported to have said: "There were two distinct schools, the Saxon and the Celtic; and four distinct styles—English, Welsh, Scotch, and Irish. The English was strong, solid, and straightforward; the Welsh full of dash and go; the Scotch, a mixture of humorous and poetic, full of strongly marked rhythms, dry and caustic at times, full of the quality which might be termed 'lilt'; the Irish was the most remarkable literature of folk-music in the world—there was no emotion with which it did not deal successfully, and none had more power of pathos and fire."

Thanks to the enthusiasm of zealous antiquarians, and the various discoveries—consisting of artistically illuminated MSS. and specimens of ornamental art work with which their researches have been from time to time rewarded—coupled with the statements of contemporaneous historians, there is no longer any doubt but that long prior to the period of the English invasion, Ireland was remarkable as the seat of highly developed artistic culture. Unfortunately they appear to have had no method of tablature or means of recording their music in writing—at all events, none such has been discovered—depending simply on their tunes being handed down by ear from harper to harper. No specimens having come down to us which we can definitely assign to that early period, and from which we could tell what it was like, we have to depend altogether on the statements of those early writers in whose works we find any mention of the subject. That their skill was great, the oft-quoted opinion of John of Salisbury goes to prove. Writing during the twelfth century, he says: "The attention of this people to musical instruments I find worthy of commendation, in which their skill is beyond comparison superior to that of any nation I have seen." Also Giraldus Cambrensis (Gerald Barry), whilst taking care to let us know that there was scarce anything else to commend among them, declares that, "The Irish, above any other nation, is incomparably skilled in symphonal music." These are not isolated opinions, for we find them supported by various writers of the twelfth, thirteenth, fourteenth, fifteenth, and sixteenth centuries, such as Caradoc of Lhancarvan, Fordun, Bacon, Spenser, Camden, and many others.

The first-named, Caradoc of Lhancarvan, the Welsh historian, asserts that the Irish devised the instruments, tunes, and measures in use among the Welsh. This statement deserves some notice. In the time of Gruffydh ap Conan, Prince of North Wales, and by his command, there was holden a congress of Welsh and Irish bards, the latter brought over to Wales by the prince himself, in order to revise the laws of the minstrels of North Wales. As a result of this meeting, there were elaborated twenty-four measures of music and five principal keys. The preamble

to the statute embodying this result says: "These are the twenty-four measures of instrumental music, all according to the rule of metre, as they were composed in a congress before many doctors of the art, of Welshmen and Irishmen, skilled in the art in the time of Gruffyd ap Cynan, and there were entered in books, by command, at the same time."

This preamble, written in the Welsh language, has been easily translated by Welsh historians; but the names of the different measures forming part of the same document had presented a great deal of difficulty, Mr. Jones, in his "Relics of the Welsh Bards," confessing his inability to translate them. Subsequently the names of these measures, forming an integral part of the statute, were discovered to be written in the Irish language and were then easily understood. This is, I think, good evidence that if the Irish did not create the Welsh music, at least their celebrity at that period—twelfth century—was such that they were called in to adjudicate and settle what the measures and scales of music in use in Wales should be.

In the old tales and poems we find music referred to as being held in the greatest esteem and accredited with wonderful powers. The following extract from "The Story of Froech." the MS. of which is preserved in Trinity College, Dublin, will show this. "His people were all cooking the wild animals. 'Let the harpers play for us,' says Ailill to Froech. 'Let them indeed play,' says Froech. . . . They play for them, so (exquisitely) that twelve men of their family die with weeping and sadness. Gentle and melodious were this triad: and they were the chants of Uaithne. The illustrious triad are three brothers, namely *Gol-traiges* (grief music), *Gen-traiges* (cheering music), and *Suan-traiges* (sleep music). *Boand* from Fairyland is the mother of the triad." We also read of the "string of knowledge" mentioned as belonging to the harp of *Cairbre*, which whenever he struck "there was not from the rising of the sun to its going down any secret of which he was ignorant."

The musical instruments in use of which we have note were the *Stuic*, a small curved metal trumpet; the *Buinne*, a larger kind of the same species; the *Corn*, a large metal tube, curved in shape like an animal's horn, but with the mouthpiece at the side; the *Adharcaidh Chiüil*, a musical horn possessing three or four ventage holes, and which was either an animal's horn or made of metal; the *Dudog*, a curved wooden pipe; and the Pipes, of which more anon. This completes the list of wind instruments of which we have any mention. It will be noticed that all were curved in form, no straight trumpet or horn having been discovered. Curiously enough, no allusion to a drum has been found in any of the writings from which we have got what

knowledge of the subject exists, that elementary musical instrument appearing to have been, if not unknown, at least unused. At one time it was supposed that the *Tiompan*, which we find often mentioned in the old writings, was a drum; but the following extract from the "Lays of Cailte, son of Ronan," which gives a description of the instrument, proves otherwise:

"Its rim was made of white silver;
The pins of yellow gold,
And the strings of bright brass."

This shows it to have been a stringed instrument, and O'Curry thinks it was played with a bow. The only instruments of percussion appear to have been bells of various sizes, and the *Crotalin* or Musical Branch. This latter was not, however, in use for musical purposes, but as a symbol of authority, for we read that during a contention for precedence between the chiefs *Finn* and *Gaul*, the bards, wishing to cause hostilities to cease, "shook the chain of silence, and flung themselves among the ranks." Various other references could be given, if necessary, to prove that it was used in public and private assemblies as a means of obtaining silence by some one in authority.

But the instrument most in use, and the one especially identified with Irish music, was the harp. It was also the instrument to the performer on which most dignity attached, for the players held social rank according to the instruments on which they performed, the harper being at the top and the piper at the bottom of the social musical scale; the harper, so to speak, being the melody, the piper the bass of the social cantata. Thus we find, in the "Brehon Laws": "This is the only species of music, that is, it is the only profession which is entitled to be ennobled . . . even though it does not attend on the illustrious . . . but it being noble in its own right." The ability to play the harp was considered a necessary part of a gentleman's education, the instrument being handed round at feasts from one to another of the guests.

The period at which the harp became known in Ireland can be but a matter of conjecture, but it was probably introduced therein during the fifth century, when the Scots—by which name the inhabitants of Ireland were then known, Ireland itself being called Scotia—Picts, and Saxons were leagued together to harass the shores of Britain. Though it may have been known long prior to that date for the matter is one of great uncertainty.

The most ancient name for the harp was *cruit*, and the form and number of strings has varied from time to time. In an ancient Irish manuscript dealing with the adventures of

Find MacCumhaill which is preserved in the library of the Royal Irish Academy, and is believed by O'Curry to be "many centuries older" than the twelfth century, we find mention of a harp with three strings. The passage I give in full, affording, as it does, an additional illustration of the three modes of music and the effects attributed to them. (I may here mention that three appears to have been considered a number of great power, as instance of which we have the three tragic poems of Ireland—viz., "The fate of the children of Touran," "The fate of the children of Lir," and "The fate of the children of Usnach.") Here is the passage referred to, as translated by O'Curry —

> "The household harp was one of three strings,
> Methinks it was a pleasant jewel:
> A string of iron, a string of noble bronze,
> And a string of entire silver.
> The name of the not heavy strings
> Were *Suantorrglés; Geantorrglés* the great;
> *Goltarrglés* was the other string,
> Which sends all men to crying.
> If the pure *Goilteargles* be played
> For the heavy hosts of the earth,
> The hosts of the world without delay
> Would all be sent to constant crying.
> If the merry *Geantorrglés* be played
> For the hosts of the earth, without heavy execution,
> They would all be laughing from it
> From the hour of the one day to the same of the next.
> If the free *Suantorrglés* were played
> To the hosts of the wide universe,
> The men of the world—great the wonder—
> Would fall into a long sleep."

That the poet here means to describe an actual instrument, and is not speaking figuratively, I have but slight doubt, though the effects attributed to the playing of it may warrant the latter assumption. Later on we find, in the "Yellow Book of Lecan," compiled in the fourteenth century, an eight-stringed harp mentioned, as follows:—"On a certain day . . . there came to him the abbot of a church of the *Ui Cormaic*, and he sat on the couch and he took his little *Ocht-Tedach* (eight-stringed instrument) unto him from his girdle and he played sweet music and sang a poem to it."

In the twelfth century there were two kinds of harps in use. The small harp, called *Keirnine*, which was thirty-two inches in height, and was strung with single chords. At first having eighteen strings, the number was increased to twenty-eight. The larger harp, called *Ceannaire Croith*, had thirty-three strings, was five feet high, and was strung with double chords. These were used for public assemblies and by bards and minstrels, who required attendants to carry their harps from place to place. The smaller ones were played whilst held on the knee, and are so represented on some of the

crosses of the eighth and ninth centuries. They were chiefly used by the ecclesiastics and by ladies. The strings were of brass and were played, the smaller with the finger nails, which were allowed to grow long for the purpose, and the larger with the plectrum. The bass was played with the right hand and the treble with the left, and the arpeggios were always played downward, commencing with the highest note of the chord. With the exception of increasing the number of strings in the smaller to thirty-three, there has been no other change in the construction of the Irish harp.

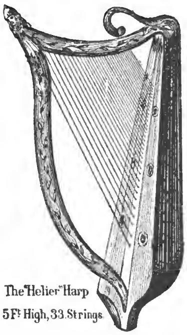
During the period between the eighth and fourteenth centuries, and perhaps earlier, it was the custom for the Irish harpers to travel through Europe in the exercise of their art, and we have it on the authority of Dante that they introduced the harp into Italy. But the invasion of Ireland marked the beginning of the decline of harp-playing. Harassed as the country was with incessant wars, music was not likely to flourish, particularly as the harpers, who naturally sided with their own countrymen, were put down with an unsparing hand. Under such circumstances, we cannot be surprised that the art of harp-playing should have died out, and that in the present day no players should exist.

Several attempts have been made in modern times to resuscitate the harp, and with this object meetings of harpers have been held from time to time, but they all failed to effect their purpose. There had been the "Contentions of Bards" at Bruree, 1730-1750, at Granard in 1781-1782, and the last, and greatest, held at Belfast on the 11th, 12th, and 13th July, 1792, when, as Bunting says, "all the best harpers of the old school then living were present." They were ten in number. Careful note was taken of their harps, method of tuning, and musical terms, and they were all found to agree in a remarkable manner.

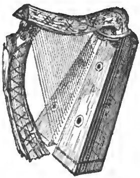
As there are but few specimens of the Irish harp known to be in existence, it may be of interest if I give a list of them.

The most ancient is that known as the "Brian Boiromhe's," in Trinity College, Dublin, supposed to have belonged to that monarch, who was killed at the battle of Clontarf in 1014, though recent investigation would seem to show it as belonging to a much later period, about the fourteenth century. It is four feet high, and has thirty strings, one to each note.

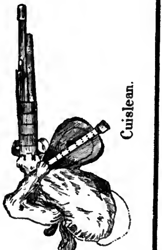
Next comes the "Dalway," or "Fitzgerald" harp, nearly twice the size of the former one. It is dated 1621, and is thought to have had fifty-two strings, but from the sounding-board being gone the number is uncertain. Petrie mentions another about the same size as the "Dalway" harp as in the keeping of the Kildare family, and dated 1672.



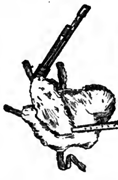
The "Helier" Harp
5 Ft High, 33 Strings.



"Brian Boru's" Harp.



Cuislean.



Piobmala.

N

Harps of the eighteenth century are more numerous: they are—

"Hempson's" harp in the keeping of Sir H. Bruce.

The "Otway" harp, dated 1707, in the possession of Captain Otway.

The "Helier" harp, five feet high, with thirty-three strings, trace lost since 1786. A representation of it is given in Ledwich's "Antiquities."

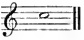
The "Magennis" harp, seen by Petrie in 1832. All trace lost.

The "Robin Adair" harp, preserved in Hollybrook House, co. Wicklow.

And two harps in the Royal Irish Academy, one of which, known as "Carolan's" harp, O'Curry believes to be a forgery; the other is plain, the only ornamentation being a bird's head in the fore pillar.

In addition to these, and as I have reason to believe hitherto unknown to collectors, is the harp which, through the kindness of my friend and pupil, Mr. R. Shafto Adair, I am enabled to show you this afternoon. Though modern in structure, and probably not older than the beginning of the present century, it cannot fail to be of interest when so few specimens exist. It is three feet in height, and is without ornamental carving of any kind, being made quite plain, the only ornamentation being a tracery of shamrocks in gold on a green ground. From the number of holes and pegs in the sounding-board, and the corresponding number of pins, of which there are two to each string, in the Neck, or "Harmonic curve" as it is called, we see that the number of strings was thirty-three. It was presented to Lady Adair on the occasion of her marriage in 1850 by one of the tenantry on the estate, who stated it to have been in his family for a great number of years.

The only other instrument in use among the early Irish was the bagpipe, which, essentially the instrument of the peasantry, can apparently boast of a very respectable antiquity. Originally, like the Scotch pipes, blown by means of a pipe in the mouth of the player, it also resembled them in its tone and use as a means for urging on the combatants in time of war. The chanter had six vent holes, and there were two drones. In this state it was called *Piobmala.* About the sixteenth century, however, its formation underwent a radical change. The mouth pipe was taken away, and in its stead a pair of bellows, strapped to the arm and worked by the pressure of the elbow, supplied the wind-bag with air. With this came a change in name, the pipes now being called *Cuislean*, or elbow-pipes. The chanter consisted of seven double vent holes, the lowest sounding D':—

 and the upper C" 

the seventh above, and there were four drones sounding, according to Beauford, great F, small F, F′, and A′—

the effect of which, if he be correct in his statement, would be decidedly more peculiar than pleasant. Probably, however, as the pipers could play without the drones, they could also shut off any one of them separately. Some of the instruments had, in addition, a second chanter sounding a fifth below the first, which was called the regulator, but its use we are not told. Indeed, the literature of the Irish pipes is remarkably scant, and their development seems to be a subject which would well repay attention on the part of some of our musical historians. The latest form of the pipes and, I am sorry to have to say, the last, for the instrument is rapidly disappearing in favour of the flute and violin, is that which is known as the *Union* pipes, probably so called from its appearance dating about the time of the union of the Irish and English parliaments. This is also blown by the bellows, and is of a soft and delicate tone. Its compass is from C′ to C‴—

two octaves—with all the semitones, and it is furnished with a rude harmony, consisting of the chords of the dominant and tonic of the key in which the pipes are set. There are three drones, which are generally either tuned in octaves to the key-note or two have the octave and one the fifth. The drones can be silenced at will.

[Illustrations: "Carolan's Draught" (harp tune), "The one and two of pipering" (this tune was considered to be the test of a piper's ability), "Gather up the money" (jig tune).] The following tunes, which I heard in Cork many years ago, and which I afterwards jotted down from memory, have not, as far as I know, yet appeared in any of the published collections of Irish music—

"Good-morrow, Fox."

Name unknown.

The earliest published collection of Irish tunes known to us is that made by Burke Thumonth, about 1720; but previous to this there may have been isolated specimens inserted in various collections of other music. Thus, for instance, we find three Irish airs in Queen Elizabeth's Virginal Book, "The Ho-hoane," "The Dumpe," and "Callino Casturame." Since Thumonth's there have been several collections all more or less correct, but the ones best known and those on which most reliance can be placed are those of Bunting, of which three series were published, and of Petrie, which stand forth as monuments of painstaking antiquarianism.

The former collection was the outcome of the last meeting of the Irish harpers at Belfast in 1792, and to complete it he travelled in various parts of Ireland collecting tunes for his work. The first book contains sixty-six airs, the second, seventy-seven, and the third, 150, of which over 120 were printed for the first time. To his collection Moore was indebted for many of the airs which afterwards became so popular in union with his poetry, no less than eleven out of sixteen airs which appeared in the first number of the Irish melodies being taken from Bunting's book. Unfortunately, Moore was not content to leave the airs as he found them,

but must needs alter them to suit his ideas, with the result in many cases of taking all the Irish characteristics out of the airs. On this point I will leave Bunting to speak for himself, which he does as follows, in the preface to the third volume of his collection. "The editor saw with pain, and still deplores the fact, that in these new Irish melodies, the work of the poet was accounted of so paramount an interest that . . . instead of the words being adapted to the tune, the tune was too often adapted to the words." That these strictures were not made without reason, many examples could be adduced to show, did time and space permit; I will, however, content myself with giving the following as a specimen of the alterations made by Moore—

"Molly Macalpin."

"Remember the glories of Brian the Brave."

The following is even more conclusive proof of the manner in which Moore used to alter the melodies and Anglicise them—

"The Groves of Blarney."

"'Tis the last Rose of Summer."

I have thought it right to go at some little length into this habit of Moore's of improving the tunes submitted to him, as his collection is the one most generally known, and the one by which Irish music is most judged. It will doubtless surprise some of my hearers to learn, perhaps for the first time, that many of the melodies given by him, as the last example shows, are less Irish than Mooreish.

Petrie's collection, perhaps the most correct and the most carefully undertaken, was made at the request of and for "The Society for the Preservation of Irish Music." One volume, and the first part of a second, is unfortunately all that has been made public. The following, compiled from

various sources, is a list of all the collections of Irish music published:—

1. Burke Thumonth ....about 1720.
2. Neal..1721.
3. Carolan's Son ....1747.
4. Bunting (3 Series)..............1796—1809—1840.
5. Mus. Soc., Dub. (28 New Irish Tunes) ...1796.
6. Holden ....1806.
7. Moore ....1808—1834.
8. Mulholland..1810.
9. National Melodies of England and Ireland 1812.
10. Thompson ....1814.
11. Fitzimmons and Smith ....1816.
12. O'Callaghan.............................. 1821—1822.
13. Smith ....1825.
14. Horncastle (3 parts)................................1844.

14A. Spirit of the Nation ....1846.

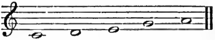
15. Conran ....1850.
16. O'Daly ....1850.
17. Petrie ....1855.
18. Levey ....1858—1878.
19. Hughes ....1860.
20. Joyce... ....1873—1888.
21. Molloy..1873.
22. Maweis ....1877.
23. Hoffman ....1877.
24. Greaves ....about 1880.
25. Stanford ....1882.
26. Tours ....about 1886.

We now come to the consideration of the tunes themselves and the modes or scales in which they were written. Owing to no authoritative description of their methods of music being in existence we have to go to the airs themselves, and deduce from whatever internal evidence we can find therein the modes in ancient use in Ireland.

Many and various have been the suggestions which, from time to time, have been put forward to account for the pervading Irishism of the old tunes. Some have stated the peculiarity to consist in the omission of the *fourth* and *seventh* notes of the scale; others, the emphatic presence of the *submediant*. Well and good. Many airs can be produced in support of both of these assertions, but what of the multitude of those, unmistakably Irish, which *have* the fourth and seventh from the key-note, or which omit the submediant? How are we to explain away the fact of the exceptions to these rules outnumbering the examples that can be adduced in support of them? The fact, which I shall endeavour to prove to you, is that the Irish melodies are not constructed according to one set scale, but according to a series of scales founded on the evolution of one primary scale, and that the pentatonic or five-toned scale.

Taking C as our starting point or tonic, we add to it its nearest related harmonic, G the fifth—I dismiss the eighth as practically the same note as the tonic—adding to these two

notes similarly the fifth of the last one we get D, and continuing the process we get A from D and E from A. Bringing these notes thus obtained within the compass of the same octave, we have our pentatonic scale thus—

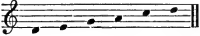


the third and sixth degrees being, of course, slightly sharper than in our tempered scale. Within my own recollection I have heard itinerant fiddlers in Ireland playing these notes slightly sharp, though I much doubt whether now it would be possible to discover a single player making use of the natural scale. This scale was divided into five modes, each step being used as a new tonic, so that there were the following series of modes—

1.

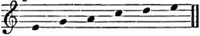
Omitting 4th and 7th.

2.



Omitting 3rd and 6th.

3.

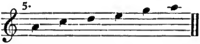


Omitting 2nd and 5th.

4.

Omitting 3rd and 7th.

5.



Omitting 2nd and 6th.

These scales I shall name as those of the "first period." It will be remembered that the note last added, and which completed our five-toned scale was E; still carrying on the process of evolution by the circle of fifths we find B added to our scale, but the number of modes was not increased by the addition of that note as a tonic, nor have they subsequently so increased, the number of modes still remaining five until the system of the scale under treatment gave way before the introduction of the modern tempered scale. We have now

reached what I will call the "second period," where we have got the six-toned scale—

1.

No 4th.

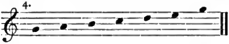
2.

No 3rd.

3.

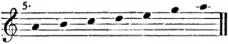
No 2nd.

4.



No 7th.

5.



No 6th.

The next step in advance of the previous one was the introduction of the next fifth, that is to say, F♯. These successive additions of semitones to the old whole-toned scale of five notes were no doubt largely due to the influence of the music of the Church.

The addition of this last fifth now completed the octave, and brings us to the "third period," of which the following were the modes—

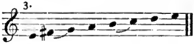
1.

With semitones between 4th and 5th, and 7th and 8th degrees.

2.

With semitones between 3rd and 4th, and 6th and 7th degrees.

3.

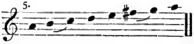


With semitones between 2nd and 3rd, and 5th and 6th degrees.

4.

With semitones between 3rd and 4th, and 7th and 8th degrees.

5.



With semitones between 2nd and 3rd, and 6th and 7th degrees.

There was one grand scale in use which went by the name of *Ardfideach*, and this was divided into three parts, called *Basascanus* (or bass), *Cionar* (tenor), and *Riunchanus* (treble). When the harpers met at Belfast in 1792 this was the scale they used, and which I here reproduce from Bunting, as it gives the compass of their harps—

It will be noticed that there was no F♯ in the lowest octave.

From the "Third Period" out the modes borrowed from, and by degrees became merged into, the modern tempered scale, the music written in Ireland now-a-days differing in no respect as regards its scales and construction from that written in any other European country.

I will now give you examples of tunes in each of the modes during the different periods as far as possible.

First Period. *First mode*, C to C, with fourth and seventh omitted—

Second mode, D to D, with third and sixth omitted—

In the above example, the sixth, it will be observed, occurs once, the phrase in which it is being repeated; but that this is a modern addition will, I think, be apparent from the manner in which that note is avoided in several other places throughout the song. It is obvious where songs, during centuries, have to depend for the accuracy of their reproduction on oral tradition, that additions will inevitably be made, unknowingly and unintentionally, in conformity with the more modern methods of modes in use. This is particularly the case with those of the "First Period," the tendency of which I have spoken causing their peculiarities to be obliterated. For this reason I am unable to give any example of the *Third mode*, E to E, with second and fifth absent.

Fourth mode, G to G, without third or seventh—

Here one of the notes, the seventh, is introduced in the penultimate bar. F♮, be it noted, not F♯, as, were it not a modern addition to the tune, the note should be.

Fifth mode, A to A, second and sixth omitted. The following is not quite as satisfactory an example as I would have wished to show, the second occurring twice, but in each instance as a very secondary note. The general characteristics of the air, however, stamp it unmistakably as belonging to this mode—

"The Bunch of Green Rushes."

Tunes written in the modes of the Second Period are naturally much more frequently met with, and the difficulty experienced in finding examples of the "First Period" vanished altogether when the Second was approached. Here are examples of this period:—

Second period. *First mode*, C to C, no fourth—

Lively. "Honest Owen."

Second mode, D to D, no third—

Quick. "Hush, the Cat."

Third mode, E to E, no second—

Slow. "The Willow Tree."

Fourth mode, G to G, no seventh—

Moderately quick. "Lamentation of Dierdre."

In this mode is also written the well-known tune "The Old Head of Denis," to which Moore has allied his poem "The Meeting of the Waters."

Fifth mode, A to A, no sixth—

"I'll be a good boy."

Entering now upon the "Third Period," I have been unable to find a single example of the use of the *First mode* in its complete form—viz., C to C, with semitones between 4-5 and 7-8. More than that, I am certain that it never could have been so used. Whether when playing in that mode the augmented fourth (F♯) was entirely omitted, or whether, when a fourth was wanted, F♮ was used, I am only able to conjecture. We have it, on the authority of Bunting, that the harpers who played before him used to alter the tuning of their harps when an F♮ was required in the melody by raising the E string in the lowest octave to F♮, and in the upper octaves lowering the F♯ to the same note; but as to when or why they used this F♮ he gives us no information. If they did use this F♮ in this manner, then the *First mode* became identical with the *Fourth mode*, only a fifth lower.

In the *Second mode*, D to D, with semitones between 3-4 and 6-7, we get the well-known tune of "Molly Macalpin," better known, since Moore's time, under the name "Remember the glories of Brian the Brave"; but the following example is, perhaps, less familiar to you—

The *Third mode* appears to have been a popular one, judging from the number of well-known airs found to be written in it. It is similar to our harmonic minor scale, but with a flat seventh, being from E to E, with semitones

between 2-3 and 5-6. The following, which is a death song, gives a good notion of the peculiarities of this scale—

A Death Song.

In this mode are the tunes known as "Avenging and bright," and "Brian Boru's March."

The *Fourth mode* is identical with our major scale of G, and so calls for no further comment. "The Coulin" is written in this mode.

The *Fifth mode*, A to A, with semitones between 2-3 and 6-7, has also many well-known airs associated with it. The tune I here give, and which has not up to this appeared in print, I took down from the singing of an Irish girl in Queenstown some years ago. It is called—

"The Step of the Cippeen."

Owing to the construction of these scales it follows that to our modernly trained ears one of the most noticeable points in an Irish air is the absence of the leading note. Once, however, the modern scale came to be in use it was only to be expected that the charm of the new scale should lead to unconscious alterations in the old melodies. Petrie bears witness to this when he says, "I rarely, if ever, obtained two

settings of an unpublished air that were strictly the same, though, in some instances, I have gotten as many as fifty notations of the one melody." That this should be so is not surprising when we remember that the correctness of the rendering depended entirely upon the goodness of the memory of the various singers. Under such conditions alterations were bound to creep in. I will here give you a very good example of this by specimens of the same Irish air as gradually altered.

The tune, which is in the mode of A, belongs to the Second Period, as will be seen by the total absence of the sixth—

In the next example we find the sixth introduced as a passing note, and in addition the accents are altered as well as the mode—

Next we find it completely modernised, the sixth being used freely, and to all intents and purposes written in A major—

Each of the avocations of daily life had its own tunes. The mother sings a lullaby as she rocks her darling's cradle, the grandmother croons over her knitting, the ploughboy whistles as he drives his team through the furrows, the lover breathes out his passion in tender sighs, the warrior sings of his battles, and the maiden's voice is heard through the meadow at eve as she sits milking the cows. There is no single occupation or sentiment of life but is represented in the wealth of Irish melody. There is music in the heart of the peasant, and he sings oft despite himself. The heart may be light and so will have its reflection in the song, or it may be heavy, and there is nothing in the world of music hath such pathos as the sadness of a sorrowful Irish song; but heavy or light, there are melodies in the heart at most times, and they are bound to come forth in the lips. The method which the peasantry have of singing these old airs gives an additional peculiarity to them. Their habit of indulging largely in pauses on certain notes of the melody, a free use of the *portamento*, and a way of varying the repetitions of the phrases by the use of graces and ornamentations according to the individual fancy of the singer, renders it difficult to reproduce in musical notation some of the striking characteristics of Irish music as sung by the people.

Dealing with the construction of the tunes, we find the love songs mostly in triple time and divided into two strains, generally of eight bars each. These are again sub-divided into two sections which generally follow one another in this order: first section; second section, oftentimes a repetition of the first either exact or slightly varied; third section, entirely fresh matter in contrast to the two preceding, and almost always in a higher part of the scale, and which leads back to the fourth section, which is a repetition more or less exact, except as to the cadence, which never varies, of the first section. The last example given is constructed on this method, as is also the well-known tune "The Coulin." Another way was to have the third section a repetition of the second, the fourth section being, as usual, a repetition of the first. A good example of this is the tune "My love's an arbutus," wherein the construction is as follows: first strain, second strain; second strain, first strain.

[Illustration, "My love's an arbutus."]

In one or other of these two forms nearly all the ancient melodies will be found to be written, but as they approached nearer to modern times other forms crept into use. A class of tunes, to which Petre has given the name of "Narrative," is much in use with the ballad or street-singers in Munster, to which part of the country they seem to be confined, being but rarely met with in the other counties. They are generally of

a slow and pathetic character, but overladen with runs and graces.

The dances of Ireland are the Planxty, the Reel, and the Jig, of which latter there were several kinds. One of these, called "The Petticotee," was at one time very fashionable, being usually danced after the Minuet. Besides these there were various set dances. Many of these jigs and planxtys were originally written as march tunes, and are often so performed, the slow march being almost unknown. Indeed, most of the marches are in 6-8 or 3-8 time, of which latter "O'Donnel's March" is an example.

DISCUSSION.

Mr. Gilbert Webb.—I recently heard a lecture delivered by Mr. Evans, of Hereford, on ancient Welsh music, and he very strongly contested the opinion that the early Welsh harpers derived any help from the Irish, more especially in the matter of harps. I cannot give you the authorities now, but he quoted from some old volume in which the Irish harp was spoken of as a recent introduction, and in very disparaging terms. I think the Irish people are greatly to be congratulated on their collections having been made orally, and not from printed matter, as in the case of English ballads. The Scotch are equally fortunate; all the collections of Kinloch and Buchanan were taken down from the lips of the people, while the English collectors of that time went to printed matter in the British Museum and other libraries. The printed "broadsides," as they were called, were the work of second-rate local poets, who, by printing their ballads, could obtain a copyright from Stationers' Hall; but they could not obtain a copyright for original ballads, and therefore they had no call to print these, unless they so altered them that they could claim them as their own. The consequence is that in collections of ballads it always strikes you that the finest belong to Scotland, whereas they are for the most part of English origin, or at least are common property. There are several examples in which Scottish ballads can clearly be traced to the West of England, but which have been altered by Scotch collectors, such were "Lady Mary Anne" and "Johnny Ford."

The Rev. Mr. Galpin.—I think Mr. Lacy said there was a small harp called the *cruit*.

Mr. Lacy.—That was the earliest name of the harp.

The Rev. Mr. Galpin.—It seems to me that must be identical with the Welsh *crwth*, the five-stringed instrument, somewhat in the form of a lyre; if so, that would

show a close intimacy between the Irish music and Welsh. I would ask Mr. Lacy if he knows whether it was always the custom to string the Irish harp with metal strings?

Mr. LACY.—Yes, and the small harp was played with the finger nails, not with the tips of the finger, and the large ones with the plectrum.

The Rev. Mr. GALPIN.—Then their harps must be totally distinct from the Welsh harp. That was always strung with gut and with triple stringing, as a rule. A harp with metal strings is quite unique.

Mr. SOUTHGATE.—I should like to ask Mr. Lacy at what date he speaks respecting the harp when it was strung with metal strings, because we know, as a matter of fact, that metal was not drawn into strings until practically rather late. Before that time I take it they must have used catgut.

Mr. LACY.—The earliest intimation we have of harps is that they are strung with brass.

Mr. SOUTHGATE.—Can you fix the date?

Mr. LACY.—No, I am unable to fix the date.

Mr. SOUTHGATE.—Was there any method of obtaining semitones if required? I refer rather to the later specimen. Some of the Welsh who used the triple harp picked out the semitones.

Mr. LACY.—I cannot say; but Bunting tells us that in the Harp Congress in 1792 they had a means of obtaining C sharp in addition to the plain diatonic scale. There is no mention of semitones in the scales themselves being obtained at all.

Mr. SOUTHGATE.—I take it that some sort of an alteration was made by the fingers simply tightening or shortening the strings, not by a mechanical arrangement.

Mr. LACY.—Do you mean in the scales I have given you?

Mr. SOUTHGATE.—I mean altering the C to make it C sharp. That was not done through a mechanical arrangement.

Mr. LACY.—On that I have no information.

Mr. SOUTHGATE.—Probably it was done by tightening the strings with the fingers. These collections of songs spoken of should be received in all cases with great caution. When melodies are taken down from the lips of persons it is very difficult to say where they are born—whether they belong to that particular district, or have come from other parts. I may refer to the collection of Welsh airs which appeared under the editorship of Brinley Richards, and was issued by Messrs. Boosey. It fell to my lot to examine that volume, and shortly afterwards I met Mr. Richards, and pointed out to him that some of the songs were distinctly not Welsh. He insisted they were, and gave one example that I will mention, and which shows how cautious one ought to be. In that book there is an air termed the "Monks' March," and attached to it is a very pathetic story relating that the

monks of Bangor were driven from their monastery and eventually murdered. During the process of eviction, they sang this doleful thing. Obviously it is comparatively modern music, and certainly it is not Welsh at all. Those who have studied our national music will recognise it is not Welsh, but late English music. I took some trouble to investigate this matter, and I found that this "Monks' March," which it is asserted the monks of Bangor sang when then they went out to be slaughtered, was really sung and played by the troops under General Monk when they went on an expedition to Wales.

Mr. Blaikley.—I should like to ask whether Mr. Lacy knows of any connection between the Welsh pipes and the Highland bagpipes? I do not mean in the mechanical construction, but with regard to the intonation and the scale of the chanter. I think that Mr. Ellis, in his appendix to the table of scales of all instruments, puts forth the idea, whether original or quoted, with regard to the Highland bagpipes that the scale of that has an Eastern origin, and is derived possibly from Arabic or Saracenic sources, and possibly came in with the crusades. It is well known the scale is neither diatonic nor one of those such as Mr. Lacy has given us this evening. I should like to ask, as a matter of interest, whether, as you have referred to the probable co-operation between Irish and Welsh musicians, you can say whether there is anything between the Celtic and Scotch in the same way with respect to the interchange of bagpipe scales?

Mr. Lacy.—The only information at all in any way bearing on the question that I know, is that in the old English and Welsh historians they mention that the intonation of the Irish pipes was much superior to that of the Scotch—much brighter.

Mr. Blaikely.—What you have given us would show that, but that is according to our standard. Probably the Scotch standard was a totally different one. The Scotch is in use to the present day, and is something quite foreign to our diatonic scale.

Mr. Southgate.—Are there any ancient bagpipes with the chanters in existence? In that case, of course, the holes would give us the scales in use.

Mr. Lacy.—Personally I do not know of any being in existence, only the union pipes, and those are very rare.

Mr. Blaikley.—There is a set now in the Military Exhibition.

The Chairman.—We have had a very interesting paper, and I will not take up your time by any further remarks on the subject, except just to mention one or two small points. It strikes me that with regard to the traditional preservation of these ancient tunes, they probably were transmitted without very much alteration for a considerable time, because we

know that the bard was usually a hereditary officer in the family of the Celtic chieftains of those times, and you would naturally expect that where an office was continued from father to son the tunes would be preserved with a considerable amount of purity. But afterwards, when they were recited by the peasantry, the variations spoken of would arise. As to comparing the antiquity of Welsh and Irish music, I will not venture on such a thorny question; but there may have been some connection between those countries. Although in some respects of different races, the Welsh and Irish seem to have had some common elements in their origin—viz., an Iberian element, which certainly existed in both Wales and Ireland, the Celtic element being different. The races which are commonly spoken of in a general way as Celtic in Ireland were really considerably mixed, and there was an earlier element non-Celtic in character, and apparently connected with a similar mixed race that existed in the Pyrenees, a race which the Romans for that reason called Celtiberians. As to some of these ancient songs, I should be very much inclined to look for an Eastern origin, because I believe that some of the Irish traditions came in very early times from the Eastern shores of the Mediterranean. We know how traditions travel, and become changed and localised in passing from one country to another. I am certain you may find tunes travelling the same way, and that it would be very difficult to ascertain the home of their birth. With regard to Carolan, who was nearly the last of the Irish bards, it is said that he was considerably influenced by the Italian music of his time, and that some compositions of his are traceable to the works of Corelli, so that, in a historical sense, Carolan does not count for much. What we should like to know would be a great deal more about the early songs of the people. Some of them are certainly curious and interesting. The connection with Scotch music must be taken with a grain of salt. The Celtic inhabitants of Ireland were, of course, largely identical with those of Scotland in race, at any rate, in the Western Highlands; but I do not know whether we have much of genuine old Scottish music in existence. I believe a good deal that is called Scotch music is modern and lowland Scottish, not Celtic at all, but merely manufactured on a particular pattern containing peculiarities of a Scotch character. It would require a long time to discuss at full length the questions which have been raised, and much previous investigation would be necessary; but we have had an interesting and suggestive paper, and anyone who is inclined to go into the matter in the spirit of an antiquary will find in it material which he can work out at home. I will therefore beg to tender the thanks of the meeting to Mr. Lacy for his paper.